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Proceedings of the American Veterinary Medical Association

American Veterinary Medical Association

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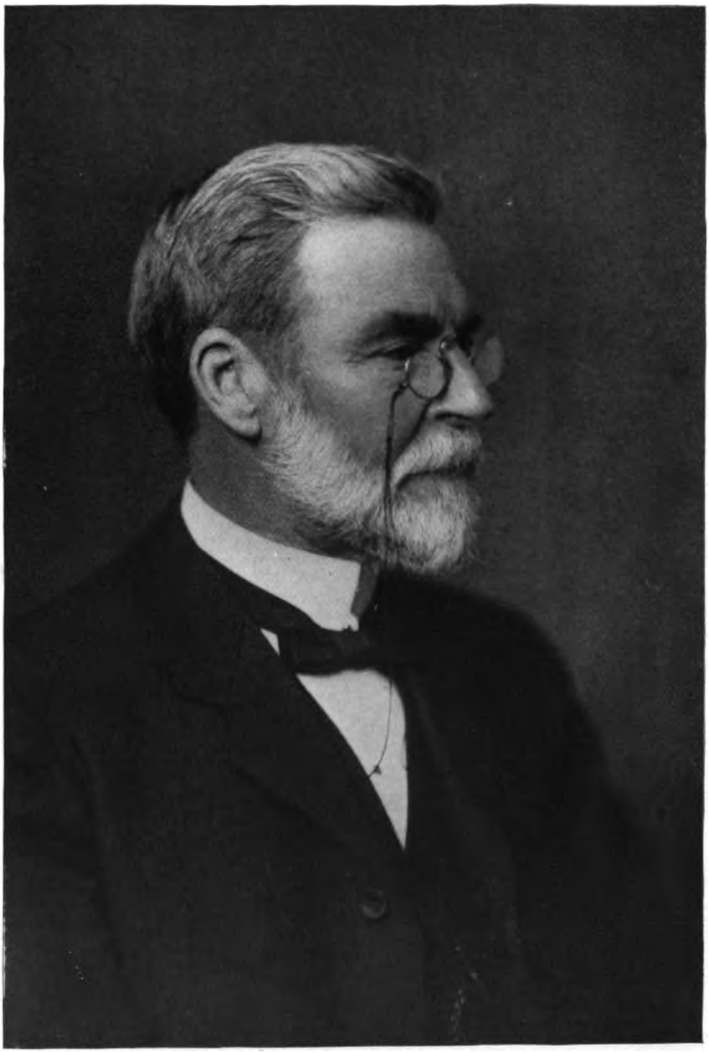

Sincerely yours
James Law

PROCEEDINGS

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

FORTY-FOURTH ANNUAL CONVENTION
HELD AT KANSAS CITY, MO.
SEPTEMBER 10-13, 1907

EDITED BY
C. J. MARSHALL
CHAIRMAN PUBLICATION COMMITTEE
PHILADELPHIA, PA.

PHILADELPHIA
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1908

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OFFICERS, 1906-1907.

President.

JAMES LAW, Ithaca, N. Y.

Vice-Presidents.

J. G. RUTHERFORD, Ottawa, Can.
L. A. MERILLAT, Chicago, Ill.
W. T. MONSARRAT, Honolulu, H. I.
E. B. ACKERMAN, Brooklyn, N. Y.
H. JENSEN, Weeping Water, Neb.

Secretary.

R. P. LYMAN, Hartford, Conn.

Treasurer.

G. R. WHITE, Nashville, Tenn.

Librarian.

W. L. WILLIAMS, Ithaca, N. Y.

COMMITTEES, 1906-1907.

Executive.

W. H. DALRYMPLE, *Chairman.*

M. H. REYNOLDS,
R. R. BELL,
S. BRENTON,
D. S. WHITE,
W. L. WILLIAMS,

Ex Officio,

JAMES LAW,
J. G. RUTHERFORD,
L. A. MERILLAT,
W. T. MONSARRAT,
E. B. ACKERMAN,
H. JENSEN,
R. P. LYMAN,
G. R. WHITE.

Finance.

THOMAS BLAND, *Chairman.*

C. E. COTTON,
R. W. ELLIS.

Publication.

C. J. MARSHALL, *Chairman.*

A. M. FARRINGTON,
E. M. RANCK,
J. B. PAIGE,
R. P. LYMAN.

Intelligence and Education.

LEONARD PEARSON, *Chairman.*

D. A. HUGHES,
M. H. REYNOLDS,
GEO. R. WHITE,
AD. EICHHORN.

Diseases.

V. A. MOORE, *Chairman.*

A. D. MELVIN,
L. A. MERILLAT,
C. H. HIGGINS,
J. R. MOHLER.

Resolutions.

S. STEWART, *Chairman.*

AUSTIN PETERS,
J. L. ROBERTSON,
W. H. LOWE,
M. E. KNOWLES.

Necrology.

G. H. BERNS, *Chairman.*

A. H. BAKER,
W. DOUGHERTY,
E. L. QUITMAN,
J. E. RYDER.

Association of Faculties.

C. E. Cotton, *Chairman.*

J. J. Repp,
G. H. Berns.

Army Legislation.

J. P. Turner, *Chairman.*

T. E. Budd,
A. S. Cooley,
J. H. McNeil,
W. H. Kelly.

Local Committee of Arrangements.

S. Stewart, *Chairman,* Kansas City, Mo.

L. R. Baker, Kansas City, Kan.
F. F. Brown, Kansas City, Mo.
B. F. Kaupp, Kansas City, Mo.
A. T. Kinsley, Kansas City, Mo.
R. C. Moore, Kansas City, Mo.
Geo. B. Nicholas, Kansas City, Mo.
C. J. Sihler, Kansas City, Kan.
A. Trickett, Kansas City, Mo.

RESIDENT SECRETARIES, 1906-1907.

UNITED STATES.

Alabama — C. A. Cary, Auburn.
Arizona and New Mexico — J. C. Norton, Phoenix, Ariz.
Arkansas — R. R. Dinwiddie, Fayetteville.
California — C. W. Fisher, San Mateo.
Colorado and Utah — C. D. Lamb, Denver, Col.
Connecticut — G. W. Loveland, Torrington.
Delaware — H. P. Eves, Wilmington.
District of Columbia — A. D. Melvin, Washington.
Florida — J. G. Hill, Jacksonville.
Hawaii — W. T. Monsarrat, Honolulu.
Illinois — L. A. Merillat, Chicago.
Indiana — R. A. Craig, Lafayette.
Iowa — G. A. Johnson, Sioux City.
Kansas and Oklahoma — L. R. Baker, Kansas City, Kan.
Kentucky — D. A. Piatt, Lexington.
Louisiana — M. M. White, Shreveport.
Maine — A. Joly, Waterville.
Maryland — F. H. Mackie, Baltimore.
Massachusetts — B. D. Pierce, Springfield.

Michigan — G. W. Dunphy, Quincy.
Minnesota — C. E. Cotton, Minneapolis.
Mississippi — J. C. Roberts, Agricultural College.
Missouri — J. M. Phillips, St. Louis.
Montana — M. E. Knowles, Helena.
Nebraska — Charles A. McKim, Lincoln.
Nevada and Idaho — J. O. Jacobs, Reno, Nev.
New Hampshire — L. Pope, Jr., Portsmouth.
New Jersey — J. T. Glennon, Newark.
New York — W. H. Kelly, Albany.
North Carolina — T. Butler, Raleigh.
North Dakota — L. Van Es, Agricultural College.
Ohio — Paul Fischer, Columbus.
Oregon — J. M. Creamer, Portland.
Pennsylvania — J. W. Adams, Philadelphia.
Philippine Islands — C. E. Nesom, Manila.
Porto Rico — T. A. Allen, San Juan.
Rhode Island — T. E. Robinson, Westerly.
South Carolina and Georgia — L. A. Klein, Clemson College, S. C.
South Dakota — E. L. Moore, Brookings.
Tennessee — G. R. White, Nashville.
Texas — M. Francis, College Station.
Vermont — F. A. Rich, Burlington.
Virginia — J. Spencer, Blacksburg.
Washington — S. B. Nelson, Pullman.
West Virginia — L. N. Reefer, Wheeling.
Wisconsin — W. H. Perrigo, Milwaukee.

CANADA.

British Columbia — S. F. Tolmie, Victoria.
Manitoba — F. Torrance, Winnipeg.
Northwest Territory — J. F. Burnett, Macleod.
Nova Scotia — W. H. Pethick, Antigonish.
Ontario — J. H. Tennent, London.
Quebec — A. A. Etienne, Montreal.

CUBA.

Cuba — N. S. Mayo, Santiago de las Vegas.

SOUTH AMERICA.

Argentine Republic — Pedro L. del Carril, Buenos Ayres.
Uruguay — D. E. Salmon, Montevideo.

SOUTH AUSTRALIA.

South Australia — J. Desmond, Adelaide.

THE CONSTITUTION AND BY-LAWS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

(*Revised Sept.*, 1907.)

CONSTITUTION.

ARTICLE I. NAME.

This Association shall be known as THE AMERICAN VETERINARY MEDICAL ASSOCIATION. It shall consist of active and honorary members.

ARTICLE II. OBJECT.

The objects of this Association are to promote good fellowship; to elevate the standards of veterinary education; to cultivate medical science and literature; to enlighten and direct public opinion regarding veterinary problems of State medicine; to protect the material interests of the veterinary profession and present to the world its achievements.

ARTICLE III. OFFICERS, ETC.

SECTION 1.—The officers of this Association shall be a President, five Vice-Presidents, a Secretary, and a Treasurer. These officers shall be elected by ballot at each annual meeting, and a majority of all votes cast shall be necessary to a choice. The term of said officers shall be one year or until their successors are chosen. They shall without delay transfer to their successors all property belonging to the Association.

SECTION 2.—The elective officers together with six members to be appointed annually by the President shall constitute the Executive Committee. One of the members shall be designated by the President as chairman of said committee.

SECTION 3.—The duties of officers, requisites of membership, times of annual or other meetings of this Association and such regulations as may be necessary for the government of the same shall be provided for in the By-Laws.

BY-LAWS.

ARTICLE I. PRESIDENT.

SECTION 1.—It shall be the duty of the President to preside at all meetings of the Association, to preserve order and decorum, and to present an address at the annual meeting following his election. The President's address shall be referred to the Executive Committee for such consideration and action as may by said committee be deemed advisable. The President shall not be eligible for reëlection so as to serve two successive terms.

SECTION 2.—The President shall have power to order payment of bills that may be presented to the Secretary during the year prior to the annual meeting if in the judgment of the Secretary said bills are true and correct and the President deems it wise to make immediate payment.

SECTION 3.—He shall appoint all committees unless otherwise ordered by the Association and shall perform all the duties prescribed by the By-Laws and resolutions of the Association.

SECTION 4.—He shall annually appoint Resident State Secretaries who shall perform such duties as are herein assigned to them.

SECTION 5.—He shall have no vote except on questions where the votes are equally divided and in the election of officers.

SECTION 6.—He shall keep on file all official documents relating to the Association that may come into his care.

ARTICLE II. SECRETARY.

SECTION 1.—The Secretary shall keep the records of the proceedings of the Association. He shall receive all applications for membership, fees, and dues, and shall pay over all moneys to the Treasurer at least once in six months. He shall give security for the trust reposed in him whenever the Association may deem it requisite.

SECTION 2.—It shall be the duty of the Secretary to notify each candidate of the receipt of his application for membership and transmit to him a copy of the Constitution and By-Laws, calling attention to the first, second, third, and fourth Section of Article VIII. of the By-Laws.

SECTION 3.—He shall notify in writing the chairman and other members of all committees of their appointment by the President or by the Association, giving the name, duties and membership of the committee; he shall also notify each Resident State Secretary of his appointment and shall perform such other duties as may be assigned to him.

SECTION 4.—He shall publish in each report of the proceedings of the annual meeting of the Association a list of the officers, standing committees, and active and honorary members with their addresses.

SECTION 5.—The Secretary shall receive an annual salary of three hundred dollars.

ARTICLE III. TREASURER.

SECTION 1.—The Treasurer shall receive and have charge of the funds of the Association and shall give security for the trust reposed in him whenever the Association may deem it requisite.

SECTION 2.—It shall be the duty of the Treasurer to put all the moneys of the Association into one fund to be appropriated for the payment of current expenses and for such other uses as the Association may direct.

SECTION 3.—He shall pay all bills which come into his hands, duly approved by the President and Secretary.

SECTION 4.—At each annual meeting he shall give a detailed statement of all his official receipts and disbursements, which statement must be duly audited and signed by the Finance Committee.

ARTICLE IV. EXECUTIVE COMMITTEE.

SECTION 1.—The Executive Committee shall meet on the day previous to the annual meeting of the Association and shall hold such adjourned meetings as the business of the Association may require.

SECTION 2.—The President may call a special meeting of the Executive Committee whenever he shall deem it necessary.

SECTION 3.—A majority of the committee shall constitute a quorum for the transaction of business. Any vacancy due to the absence of an appointed member shall be temporarily filled by the President, acting Vice-President, or, in their absence, by the chairman of the committee.

SECTION 4.—The records of the proceedings of the Executive Committee shall be kept by the Secretary.

SECTION 5.—The Executive Committee shall be invested with power to hear and determine upon complaints filed before it in writing relative to the improper conduct of any member of the Association, and shall, if thought advisable, summon the member so charged to appear before it at the next annual meeting of the Association to answer the charges and make defence. If the committee, after fair and impartial trial at the said next annual meeting, finds the defendant guilty of all or part of the offence as charged, said Executive Committee shall report to the Association a summary of the charges and evidence submitted on both sides together with such recommendations as may by said committee be deemed wise; but no public report of such charges or evidence shall be made by the Executive Committee or by any member thereof until after the trial of the accused member.

SECTION 6.—The Executive Committee shall select the place for the meeting of the Association and execute such other duties as the Association shall direct.

ARTICLE V. COMMITTEES.

SECTION 1.—The regular committees of the Association in addition to the Executive Committee shall be as follows, and the members of the same shall be appointed by the President at each annual meeting or as soon thereafter as may be practicable.

Committee on Intelligence and Education, five members.

Committee on Diseases, five members.

Committee on Legislation, five members.

Finance Committee, three members.

Publication Committee, five members.

Committee on Local Arrangements, number of members at option of President.

Committee on Necrology, five members.

Committee on Resolutions, five members.

SECTION 2.—It shall be the duty of the Committee on Intelligence and Education to collect and distribute literature calculated to develop public interest in veterinary sanitary work and veterinary legislation. It shall report to the Association recent veterinary facts and intelligence. It shall be within the province of this committee to inquire into the curricula and methods of veterinary colleges and report to the Association such suggestions and criticisms concerning the same as it may deem advisable.

SECTION 3.—It shall be the duty of the Committee on Diseases to investigate the character and extent of prevalent diseases throughout America and report upon the same at each meeting of the Association.

SECTION 4.—It shall be the duty of the Committee on Legislation to use its best efforts to secure the enactment or the defeat of such legislation as the Association directs.

SECTION 5.—It shall be the duty of the Finance Committee to audit the financial records of the Secretary and the Treasurer's accounts. This committee shall also devise ways and means to raise funds, when necessary, to meet the expenditures of the Association, and shall report its proceedings at each annual meeting.

SECTION 6.—It shall be the duty of the Publication Committee to make all necessary arrangements for reporting the meetings of the Association. Said committee shall have charge of the publication of all reported proceedings, papers, reports and other documents submitted to them by the Association. It shall be authorized to make summaries of such local and other addresses as have not permanent scientific value and to summarize discussions of business and other matters that come before the Association when thought advisable by the committee. All bills incurred by the Publication Committee must first be approved by the chairman of said committee and shall then follow the regular course as for other bills.

SECTION 7.—It shall be the duty of the Local Committee of Arrangements to make such local arrangements as may be necessary for the meetings of the Association, to furnish for publication in the annual report of proceedings a suitable account of the clinic and entertainment and to assist the President and Secretary as they may direct.

SECTION 8.—It shall be the duty of the Committee on Necrology to prepare and present memorials of deceased members.

SECTION 9.—It shall be the duty of the Committee on Resolutions to consider all resolutions which may be referred to it by the Association and report the same together with such other resolutions as it may deem wise.

SECTION 10.—Each Resident State Secretary shall annually submit to the Association a report concerning recent veterinary facts and prevalent diseases within his jurisdiction and shall aid the President and Secretary by the performance of such other duties as they may direct.

SECTION 11.—The President and Secretary shall be *ex-officio* members of the several permanent committees except the Committee on Publication of which the Secretary shall be an active member. The President shall have the power to convene any of the various committees whenever in his judgment such action shall be necessary.

ARTICLE VI. CANDIDATES FOR MEMBERSHIP.

SECTION 1.—Each application for membership shall be submitted in the applicant's own handwriting upon one of the application blanks of the Association and be duly vouched for in their own handwriting by two active members of the Association in good standing resident in the applicant's State or by the President and Secretary of the Association. Said application must be in the hands of the Secretary at least thirty days before the third Tuesday of August. The application must be accompanied by eight (8) dollars to cover the membership fee and first year's dues, which sum shall be returned to the applicant should he fail of election to membership.

SECTION 2.—Only those who have been graduated from a regularly organized and recognized veterinary school which has a curriculum of at least three years of six months each especially devoted to the study of veterinary sciences and whose corps of instructors shall contain at least four veterinarians may be admitted to active membership.

This Association will admit to active membership graduates of agricultural colleges which require a four-year course when said graduates have been admitted not farther than the second year in a recognized three-year course veterinary college and graduated therefrom; *provided,* said graduate has taken the following studies or their equivalent during his agricultural course, viz.: two or more years of not less than three hours a week in each, of the following: elementary physiology, botany, zoology (including animal parasites), agriculture (including breeds of stock and stock breeding), and veterinary science (under a qualified veterinarian).

These provisions shall include the graduates of former two-year schools that have maintained the three-year course for the last five years.

SECTION 3.—The following shall be the form of application blank:

APPLICATION FOR MEMBERSHIP.

REQUIREMENTS FOR ADMISSION TO MEMBERSHIP.

EXTRACTS FROM BY-LAWS.

(Here quote Sections 1 and 2, Article VI.)

To the American Veterinary Medical Association:

....
(Date)

I hereby make application for membership in your Association. My age is......years. I was graduated from.................................
(Name of veterinary school)
in the year.... My preliminary education was as follows................
.... I spent......months in actual attendance at each of the following veterinary colleges...

My residence is ....
(Post-office) (State)

....
(Name) (Degree)

We, the undersigned vouchers, hereby certify that by reason of personal acquaintance or other reliable information we consider the above-named applicant a man of good moral character and reputable business methods.

VOUCHERS:

....		**Members of The American Veterinary Medical Association.**
(Name)	(Degree)	
....		
(Name)	(Degree)	

SECTION 4.—All applications shall be referred to the Executive Committee for investigation and recommendation. Favorable recommendations shall be reported in writing to the Association.

SECTION 5.—All candidates reported favorably by the Executive Committee shall be balloted for by the Association. Those receiving a two-thirds vote of the members present shall become members of the Association upon signing the Constitution and By-Laws as provided in Section 7.

SECTION 6.—Applications adversely considered shall not again be entertained until the expiration of one year.

SECTION 7.—A member-elect shall within one year sign the Constitution and By-Laws and be thereupon entitled to a certificate of active membership. If he fails to comply with this provision, he shall cease to be a member-elect.

SECTION 8.—The following shall be the form of certificate of membership:

These presents are to certify that.........................., having been duly examined and found worthy, is this day admitted to membership in the American Veterinary Medical Association, organized in the year of our Lord eighteen hundred and sixty-three.

In testimony whereof we have fixed our hands and the seal of the Association this........day of ...., 19..

...........................President.
...........................Secretary.

SECTION 9.—Members who have been in active membership for twenty-five consecutive years shall constitute the honor roll of this Association and shall be exempt from dues.

ARTICLE VII. HONORARY MEMBERS.

SECTION 1.—Any member may propose a candidate for honorary membership, the rank or station held by such candidate being stated in writing. The proposal shall be referred to the Executive Committee and considered by this committee at its next meeting. The Executive Committee shall then report its action upon said proposal to the Association, and, if favorably recommended, the person shall be balloted for by the Association at a subsequent session. A majority of votes cast shall constitute him an honorary member.

SECTION 2.—Not more than three honorary members shall be elected in any one year.

SECTION 3.—Honorary members may take part in debate, but shall not be entitled to vote.

SECTION 4.—The President of the United States shall be *ex-officio* an honorary member during his term of office.

SECTION 5.—The following shall be the form of certificate for honorary members:

This is to certify that the American Veterinary Medical Association has received..............................as an honorary member.

In witness whereof, these presents are signed by the President and Secretary and sealed by our common seal this......day of..........,' 19..

...........................President.
...........................Secretary.

ARTICLE VIII. CONTRIBUTIONS AND ARREARS.

SECTION 1.—The active membership fee of this Association shall be five dollars.

SECTION 2.—The yearly dues of the Association shall be three dollars payable in advance.

SECTION 3.—The Association, at an annual meeting, may assess such amounts as may be requisite to meet necessary expenses.

SECTION 4.—Any member eighteen months in arrears, shall be notified twice by the Secretary within six months, and, if the arreas are not paid before the next regular meeting of the Association, the Secretary shall report said delinquent to the Executive Committee for consideration of the question of suspension from membership.

ARTICLE IX. ORDER OF BUSINESS.

Roll call.
Submission of the minutes of the previous meeting as presented in the annual report and in other records kept by the Secretary.
Unfinished business.
President's address.
Report of Executive Committee.
Admission of new members.
Report of other regular committees.
Reports of special committees.
Reports of officers and Resident State Secretaries.
Discussion of reports.
New business.
Election of officers.
Papers and discussions.

ARTICLE X. MEETINGS OF THE ASSOCIATION.

SECTION 1.—The annual meeting of the Association shall be held on the second Tuesday and following days of September of each year and may be adjourned from day to day. The Executive Committee shall select the place of meeting unless otherwise ordered by the Association. Due notice of all meetings of the Association shall be given by the Secretary.

Section 2.—Special meetings shall be called by the President, or, in his absence, by the ranking Vice-President, upon the written request of ten members who shall specify the particular object of such meeting. A notice of such special meeting and its object shall be given at least one month before said meeting. The President is also authorized to call meetings at his discretion, the active members being duly notified as above.

Section 3.—At a special meeting no other business than that which shall have been specified in the requisition and in the published call for the meeting shall be transacted.

Section 4.—Twenty-five members shall form a quorum for the transaction of business and a quorum shall always be presumed present at annual meetings unless an actual count be called for.

Section 5.—In the absence of the President and Vice-Presidents the senior past President present shall preside. In case none of these should be present the Association shall elect a President *pro tempore* from the floor.

Section 6.—Every member shall observe order and decorum in the Association meeting, and shall pay due respect to the President and other officers and to his fellow-members.

Section 7.—All questions of order not specially provided for shall be decided by the usual parliamentary rules, Roberts' Rules of Order being taken as the guide and standard.

Section 8.—Unless otherwise ordered by the President the work of the Association shall be divided into three daily sessions, viz.: from 10 A. M. to 12 M., 2 to 5 P. M., and 8 to 10 P. M.

Papers shall not consume in reading more than twenty minutes. Each discussion must be confined strictly to the subjects of the paper or report before the Association. Each speaker shall be limited to ten minutes and shall not speak a second time until all members who desire to speak shall have had an opportunity to do so. A member speaking the second time in the same discussion shall be limited to five minutes except by unanimous consent.

Section 9.—All resolutions presented to the Association shall be in writing and be referred without discussion to the Committee on Resolutions.

Article XI. Code of Ethics.

Section 1.—Members of this Association are expected to conduct themselves at all times as professional gentlemen. Any flagrant violation of this principle shall be considered by this Association as a violation of this code and may subject the violator to suspension or expulsion.

Section 2.—No member shall assume a title to which he has not a just claim.

Section 3.—No member shall endeavor to build up a practice by undercharging another practitioner.

Section 4.—It shall be considered a breach of the code of ethics for a member to assail the professional reputation of a fellow-practitioner, particularly for his own individual advancement.

SECTION 5.—In all cases of consultation it shall be the duty of the veterinary surgeon in attendance upon the case to give the opinion of the consulting veterinary surgeon (whether favorable to his own or otherwise) to the owner of the patient in the presence of all three. In case of the absence of the owner the veterinary surgeon consulted may, after giving his opinion to the attending veterinary surgeon, transmit it in writing to the owner through the medical attendant. It shall be deemed a breach of this code for a consulting veterinary surgeon to revist a patient without a special invitation by the attending veterinary surgeon or agreement with him.

SECTION 6.—In advertising the veterinary surgeon shall confine himself to his business address. Advertising specific medicines, specific plans of treatment, or advertising through the medium of posters, illustrated stationery, newspaper puffs, etc., will not be countenanced by this Association.

SECTION 7.—Any person who shall advertise or otherwise offer to the public any medicine the composition of which he refuses to disclose, or who proposes to cure disease by secret medicines, shall be deemed unworthy of membership in this Association.

SECTION 8.—It shall be deemed a violation of the code of ethics for any member of this Association to contract with or through the officers of any livestock insurance company for the professional treatment of the members' stock so insured; but this rule shall not prevent any member from becoming an examiner of risks and acting in the capacity of an expert for the same.

SECTION 9.—Each member shall observe the code of ethics adopted by this Association and be answerable to the Executive Committee for any breach of the same.

ARTICLE XII. SUSPENSION AND ALTERATION OF CONSTITUTION AND BY-LAWS.

SECTION 1.—Any motion for suspension of any article of the Constitution or the By-Laws, excepting as herein provided, must be offered in writing, be signed by the party making the motion, and must be adopted by a two-thirds vote of members present.

SECTION 2.—A By-Law may be suspended only for the purpose of facilitating important business of the Association, and the suspension must be of such a character that it cannot interfere with the vested rights or privileges of any member.

SECTION 3.—A suspension of the By-Laws may be made by unanimous consent at any meeting of the Association for the election of active or honorary members.

SECTION 4.—A suspension of the By-Laws may be made by a two-thirds majority for the purpose of changing the order of business.

SECTION 5.—All proposals for alteration of the Constitution or By-Laws shall be stated in writing. No alteration proposed shall be acted upon until it has been referred to the Executive Committee and presented anew by them. All the members of the Association shall be notified at least ten days previous to any action thereon.

The following Veterinary Colleges were endorsed by the Association at the forty-fourth annual meeting, 1907, as qualifying graduates for membership:

American Veterinary College,
Chicago Veterinary College,
Cincinnati Veterinary College,
Columbian University, Veterinary Department,
Columbia Veterinary College,
Foreign Recognized Veterinary Schools,
Harvard University, Veterinary Department,
Indiana State College, Veterinary Department,
Iowa State College, Veterinary Department,
Kansas City Veterinary College,
Laval University, Veterinary Department,
McGill University, Veterinary Department,
McKillip Veterinary College,
National Veterinary College,
New York-American Veterinary College,
New York College of Veterinary Surgeons,
New York State Veterinary College,
Ohio Veterinary College,
Ohio State University, Veterinary Department,
Ontario Veterinary College, prior to 1895,
Royal College of Veterinary Surgeons, England,
University of California, Veterinary Department,
University of Pennsylvania, Veterinary Department,
Washington State College, Veterinary Department.

Proceedings of the Forty-fourth Annual Convention of the American Veterinary Medical Association

Held at Kansas City, Missouri, September 10-13, 1907.

TUESDAY MORNING, September 10, 1907.

The convention was called to order at 10.25 A.M., by the President, James Law.

PRESIDENT LAW: Ladies and Gentlemen,—The forty-fourth annual meeting of the American Veterinary Medical Association is in session. The first item on our program is the address of Mayor Beardsley of Kansas City, who has kindly consented to offer to us a welcome to this great and prosperous city. I have the honor to present Mayor Beardsley.

ADDRESS OF WELCOME.

By HON. HENRY M. BEARDSLEY,
Mayor of Kansas City, Mo.

MR. PRESIDENT, LADIES AND GENTLEMEN:

I assure you it gives me pleasure on behalf of the citizens of Kansas City who speak through me to give you a welcome this morning. This day in which we live has become essentially a day of conventions, gatherings of this kind of organizations, both local and national, and international; since the duties of the office of mayor have been put upon me I think I have come to realize that, as never before, having been so closely in touch with these organizations. I know that in our own city and state almost every calling, trade and profession has its local organization, and that all of these same trades, callings and professions have their organizations which reach out into larger territory, some of them being national and international in their scope. We know that when men nowadays wish to do or accomplish any great purpose in any line we are wont to call conventions together, to call in convention men who are interested in that particular line and talk over the problems of the hour, to get the advice and counsel of one another, the force, influence and power which comes from going out in a united effort for the accomplishment of fixed purposes. And so it is all the way up until we come to the last great field of international affairs, and even there we find in these days that we are undertaking to solve the great problems that arise in the dealings between nations by gatherings such as that which is now in session at the Hague.

While there are a great many advantages in this sort of thing there are also some disadvantages. I want to assure you gentlemen that a man in my position in a city like this, where we are continually having conventions, and where the mayor is charged with the duty of welcoming them, it is more or less of a task, I may say a difficult task, for him to know what to say in order not to unnecessarily repeat himself. When thinking about that I am reminded of an incident that happened here in Missouri some few years ago. We had among us a man, who held a political office, a unique character, and a member of the democratic party, who tells this personal experience: in one campaign some years ago he very carefully prepared a speech, which he determined to deliver in different parts of the state. On the occasion of the first evening meeting, he noticed, when starting his address, a man sitting down in a front seat who was looking very intently into his face, and who seemed to be very much interested in what he said. After completing his speech this man rushed up, took him by the hand, and said, " Colonel A., that is one of the finest addresses I ever heard. I am wonderfully well pleased with it. Where do you speak next, Colonel A.? " " I am going to speak to-morrow evening over in a neighboring county." The next evening when Colonel A. got up to make that carefully prepared speech, as he looked down over his audience he saw this same fellow sitting in a front seat, and, of course, was bothered by it a good deal, because he hardly wanted to deliver the same speech twice, but still he managed to work over the speech, and got along very well. You know it is an embarrassing thing to deliver the same thing more than once to the same fellow. After the meeting was over this fellow rushed up to him, and with great enthusiasm said, " I think, sir, that you improve every time. You improve every time. That is one of the finest speeches I have ever listened to in my life. Where do you speak next, Colonel A.?" "I speak away up in the northwestern corner of the state, sir." When the time came and Colonel A. got up to deliver this same carefully prepared speech there was this same fellow, and the Colonel began to make every effort to change his speech so as to make it fit the occasion as well as he could. On finishing this same fellow was among the first to congratulate him. "It is one of the finest speeches I have heard, sir. Where do you speak next?" "Well, sir," said the Colonel, "I speak in Hell." (Applause.) Now some such embarrassment, you know, must necessarily come to a man in these places who from time to time has to speak a word of welcome to visiting delegations and conventions. (Laughter.)

Naturally, you expect upon such an occasion as this that one representing a great and growing city like Kansas City shall have something to say about the city itself. But, of course, it would be a long story to say very much about it. I want to say in a general way, however, a few things about the city. You have probably noticed, especially those of you who are here for the first time, the fact of the unevenness of our city, and the fact that it seems to be built upon a series of hills and hollows. That fact at the very beginning made it somewhat difficult to build a city here. We had to haul down the hills and fill up the hollows and have become convinced that in this very unevenness of our conditions we have the basis for making this one of the most beautiful cities in the world. Away back in the early 90's a little group of men among us conceived the idea of developing plans for the beautifying of this city. One man who took the lead in it really wore out his life in the work. Quite a number of years ago this man got together an organization of one hundred men, who undertook the problem of beautifying this city, and, as the result, we have our system of boulevards and parks. A gentleman said to me the other day on the cars, and I believe he was speaking the truth, that there was no city of its size, and very few, if any, of the larger cities, that had a better or more complete plan for the making of a beautiful city than that which existed right here in Kansas City. And then, too, our city has been distinguished from the beginning with a great broad public spirit. That has been one of the best uplifting forces which we have had. We do not ask in Kansas City when we come together, "What is there in this individually, what is there in it for me," which has been the spirit that men have come together in in many enterprises, but the spirit has been, "what can we do for one another and for our city, to make it a prosperous and beautiful place in which to live." This spirit has been one of our most valuable assets. As illustrating that spirit I must tell you one story. I believe it is true. There was a young man here who used to exaggerate, I am afraid, somewhat, even about Kansas City. He went some years ago across the plains to the Pacific Coast. Before going, one of his friends said to him, "Now, Joe, when you get out there I don't want you to go to lying about Kansas City, because, if you tell such exaggerated things about Kansas City, nobody will believe it." Joe said, "I will tell you what I will do. If ever you find me going too far, you just step on my toes." These fellows were later in one of the great hotels on the Coast, among a group of gentlemen from other places, and one of the gentlemen had just been telling about some great building in New York City, how long it was, how deep it was, how high it was, and what a great, magnificent building it was generally. This fellow that I am speaking about stood it as long as he could, and then said, "Why, sir, that is nothing. We have a building down in Kansas City that is a whole block long, that is six hundred feet long, and twenty stories high." Just then his companion stepped on his foot, and he says,—"and two feet deep." (Laughter.)

There is another story which some of us rather delight to tell as showing the way that Kansas City is regarded. We have a minister of the gospel, and, of course, his testimony ought to be accepted in any court. He says that this happened to him one time in the city of Des Moines, Iowa. He came in in the evening and was about to take his train, and, the colored porter of the Pullman passing by where he stood, he asked him where the train was. He said, "Where are you going, sir?" "I am going to the best town on the face of the earth, Kansas City." "That car is down two cars further to the front, sir. We never run no such cars as these back here to Kansas City."

The latest one I heard was a few days ago, to the effect that there were two men met in a club. One of them had been a Kansas citizen from time to time and had come back upon a visit, they were talking about the city and about old times here, and the man who used to live here said to the other, "Kansas City is getting on famously." "Well," said the other, "I go there once in a while to look it over." "Well," said the Kansas City man, "how long is it since you were out there?" "I was out there about ten days ago." "Well," said the other, "you ought to see it now." (Laughter.)

Now, gentlemen, you have met here in this convention. I have no doubt you have mapped out for yourselves things which are to be accomplished which are worth accomplishing. These conventions indicate, it seem to me, a number of things. They indicate to us a broader and more companionable spirit, and the spread of the social side of these gatherings of men who are in the same calling or profession. They indicate also that there is a broader and more liberal spirit among us. It is not very long back when men in business life, or when going into any calling or profession, thought it was their duty to keep to themselves what they had learned in order to be somewhat superior to their fellows, but we have gradually come to learn, and I believe it is a very great thing indeed, that each can give all that he has in the way of increased knowledge, and in giving get back more than he gives. Then, again, as suggested, in these gatherings we are able to accomplish many things not otherwise possible. I presume that the most of you are not at all alarmed about your profession. The day of the horse has not gone by. I have wondered sometimes, however, in noticing how, in the world, things move in cycles. It is said that the surgeon was formerly a barber, but that with the progress of events and the tendency to specialize in occupations, the barber dropped the razor and took to surgery. (Laughter.) And I have wondered sometimes whether the wheel would not turn around and the time come when our medical books shall contain several chapters on the anatomy, proper construction, and medical treatment of automobiles. I do not believe, however, that we need to be alarmed about that at present.

Now, gentlemen, I know that you are here for business. I am glad to submit to you in the name of the city a welcome within our gates. We have not any walls about our city, and, therefore, there are no keys to deliver. The walls which are about our city are those of industrial energy and individual worth. We do not want those to come in and be among us who are not of that kind. Walls of that character are distinctive of Kansas City rather than walls of stone and cement. That we know is the spirit of Kansas City.

Gentlemen, the city is yours. While you are here it is not only yours, but you have the entire freedom of the town; and I want to suggest in conclusion this morning that as mayor of the city I have the full and unlimited pardoning power. I shall not hesitate to use it in your behalf in case it becomes necessary. I do not think, however, in looking at this gathering, that any of you are apt to get into trouble, but if you do, let me say to you now that I will not hesitate a moment upon any occasion to grant pardons to the extent of the power I have.

Representing the people of Kansas City and myself, let me say that we are glad you are here and we hope that your convention will be a profitable and pleasant session.

I thank you. (Applause.)

RESPONSE TO THE ADDRESS OF WELCOME.

By W. H. DALRYMPLE,
Baton Rouge, La.

Mr. President, Mayor Beardsley, Fellow Members, Ladies and Gentlemen:

On behalf of the American Veterinary Medical Association I desire to thank you most heartily, Mr. Mayor, for the welcome, clothed in such genuinely hospitable language, you have extended to us to-day to your magnificent city of large commercial, industrial and educational activities. The only regret I have to offer, sir, is, that some other member of the Association, more gifted with the power of oratory, had not been chosen by our worthy President to make the response. I can, however, assure you, sir, that it is most gratifying to the members of this body as we annually pitch our missionary tent, so to speak, in the different large centres of population throughout this great country of ours, to find that sentiment is undergoing a rapid and radical change with regard to comparative medicine and that our people, everywhere, are fast coming to a realization and an appreciation of the value and the importance of the veterinary profession, not merely in relieving the sufferings and the infirmities, and in lengthening the period of usefulness, of our dumb servitors, but as the conservors of so much of the wealth of the country invested in its immense flocks and herds, and, also, as the conservors of the health of our citizens, whose gastronomic taste is so largely animal as to rank second, in the per capita amount of meat consumed per annum, on the list of the civilized nations of the world. It has ever been held man's sacred duty, sir, to preserve in health, or alleviate the sufferings, of those animals indispensable to his existence, for the many purposes to which they may be applied, and for which we are told they were expressly created. Looked at from this point of view, it may be said that veterinary science has been cultivated since fabulous antiquity. It was only toward the latter half of the eighteenth century, however, that a few illustrious names could be reckoned who were leading veterinary studies along the path of progress and extension. Probably the greatest luminary of that century was Bourgelat, who, in 1761, in Lyons, France, founded the first veterinary school. Bourgelat was an eminent lawyer and an able writer; but although learned in philosophy and reared to the glories of the forum, he abjured the French bar in order that he might found that school, which was subsequently patronized by royalty, and to which students flocked from every part of France, Germany, Italy, Switzerland, Denmark and Sweden. Since the founding of the Lyons school many similar institutions have been established throughout the civilized world, one at least of which is to be found in your own progressive city of the central west. The natural outcome of the establishment of the schools has been, of course, a gradually increasing number of graduates in the profession, who, necessarily, have demanded organization for mutual benefit and protection. And you have just welcomed to your city to-day, sir, one of the largest and most influential veterinary organizations to be found in any country; embracing in its membership representatives not only of the different institutions on this continent, but of the European schools as well; some of whom (among both the domestic and the foreign product) have the honor to possess distinguished representatives of an international character.

Although in point of years, sir, the veterinary profession on this western continent may be said to hardly have doffed its swaddling clothes, yet the demands made upon it are both numerous and varied. Besides the call for private practitioners, the national government is constantly seeking thoroughly equipped veterinarians to assist it in controlling and eradicating the different specific infections to which our domestic animals are susceptible, and to guard our citizens, and those of other countries, against the dangers of an unsound and unwholesome meat supply. State and local boards of health are acquiring the services of the trained veterinarian to aid them in successfully dealing with the diseases of animals communicable to man. The agricultural colleges throughout the country are employing members of the profession to instruct their students in the science and art of veterinary hygiene. No agricultural experiment station is, to-day, equipped without its veterinary officer or animal pathologist to investigate the causes of, and the remedial measures for, the more obscure animal diseases incident to his own state; and the professional aid of the veterinarian is sought after by our national war department to maintain, in fighting trim, its mounted arm of the service in order to successfully combat a possible foreign foe. This Association, sir, wields a most potent influence for good in the better equipment of members of the profession for these various branches of the work, because it largely controls veterinary education in this country, and is ever aiming at higher standards of proficiency for graduation, and for its own prospective membership.

We are here to-day, sir, in response to a most cordial and pressing invitation, and although we hope, and we intend, to avail ourselves, to the very utmost extent, of the hospitality so generously proffered us, our main purpose is work; work that will tend to increase the knowledge of the individual member; work that will tend to uplift and advance our noble profession as a whole; work which, we trust, will tend to add to the health, to the wealth and to the happiness, not alone of those of us who are privileged to live under the protection of the Stars and Stripes, but of our friends and neighbors to the north and to the south of us as well.

In the name of the Association, sir, I desire again to thank you most heartily for your cordial words of welcome. (Applause.)

PRESIDENT'S ADDRESS.

By JAMES LAW.

In facing the pleasant duty with which you honored me, I claim the privilege of speaking freely from a lifetime of experience as a veterinarian and teacher. It has been well said that the medicine of to-day differs radically from that of twenty years ago. I had the privilege of listening to an able professor who followed the great Sydenham in his doctrine of ***epidemic influence,*** and who denied the contagious nature of epizoötic diseases. It is still interesting and instructive to read their arguments in favor of the all-controlling influence of telluric, atmospheric, and dietetic conditions, and to suspect that we modern students are at times too much tempted to ignore obvious truths in favor of others no less patent, which dominate the medical mind of to-day. Then as now, the mind, strongly preoccupied by a foregone conclusion, followed the time-honored habit of magnifying the evidence which made for its own preconceived belief, and of minimizing or ignoring that which would lead to an opposite conclusion. Every epidemic and epizoötic from smallpox to scarlet fever and from rinderpest to rabies was considered due to the epidemic constitution, and was to be met by changing the constitution and environment. The great fundamental truth of a living pathogenic germ, self-multiplying and self-propagating, did not as yet dominate the medical mind.

To us such a position seems absolutely impossible and we are tempted to recall the statement of Carlyle that our race consists of " so many hundred millions of human beings—mostly fools."

But we must not forget that the human mind, even to-day, is far from perfect in its operations; it is difficult to keep before it all phases of any given problem and still more difficult to give due and equally just emphasis to all such phases. The mind of a Socrates, Plato or Aristotle was just as clear, sound and potent as the minds of modern Europe or America.

The ancients knew intimately the stars and planets and their courses, and arranged their calendars accordingly, but it required the genius of a Copernicus to upset the theory that the earth was centre of the universe, round which the whole cosmos revolved.

The brightest minds of early times were familiar with the generation and force of steam, but it required the mind of a Newcome or Watt to effectively harness this great power and set it to do the work of the world. Once this was done, its adptability was so self evident that we wonder how the solons of earlier times could have escaped recognition of such an obvious application.

The same is true of every great discovery. When demonstrated it is simple and obvious to the mind cognizant of the conditions which led up to it, yet for untold centuries it had remained a closed book to humanity as a whole.

Medicine furnishes no exception to this general rule. To achieve an advance two things are required: First, that we stand on the vantage ground of the best science of the past; and, second, that we cultivate the appreciative mind ready to avail of the fingerposts in past and present science which point to a new and fruitful departure.

Veterinary examples of this great truth crowd upon us. Gastric indigestions were first treated by stimulant ammonias and essential oils; then the alkalinity of ammonia suggested alkaline preparations of soda and potash which also cured by arresting the acid fermentation; then the acknowledged arrest of the fermentation suggested the successful use of antiseptics, such as essential oils, sulphites, chloral, etc. The local treatment of milk fever by supposed antiseptic measures appeared to establish the fundamental value of potassium iodide, but, on experiment, other antiseptics did equally well, as did distension by bland liquid mixtures, colostrum, oxygen and even sterilized air. The advance was natural and indeed inevitable, yet the great mass of veterinarians was not instantly appreciative, and it remained for a few observant, resourceful and meditative persons to rise to the demand of the moment and to apply the torch to the accumulating, illuminating materials and light up the darkness of previous doctrines and therapeutics.

Few advances of all the ages are pregnant with more good to humanity than this simple development of the field of milk fever. We can now secure the survival of the fittest, breed races more and more productive of milk, raise the average yield per cow to five times the former amount and upward, and the financial return from $500,000,000 to $2,500,000,000. This makes no account of the resulting increase of live stock, and natural fertilizers, of the soil enrichment, and of the increase of farm crops generally.

Great minds as well as small ones, suffer from the one-sided and imperfect view of things. The immortal Pasteur who robbed hydrophobia of its terrors, bringing well-founded hope and comfort to the bitten man, yet in his endeavor to immunize the dogs of France against rabies, by inoculation with a weakened virus, has rivetted the chains upon the nation when rabies could and should have been eradicated as it has been from the British Islands. The great Robert Koch fell into a similar error in exploiting his tuberculin as a cure for tuberculosis. With his mind filled with the prospect of personal benefit *to the individual attacked,* he failed to appreciate the fact that, in the lower animals, the question of controlling a contagious disease is essentially an economical one, and that no animal is so sacred, or so valuable, that it can be safely preserved at the expense of infecting others and perpetuating for all time a deadly pestilence. The blinding effect of a fixed habit of mind is further shown in the fact that he and his followers have their eyes closed to the obvious fact that tuberculosis, in neither man nor beast, produces in its victim such antagonism to the bacillus as would give reasonable assurance of the extinction of that microbe in the same system. The moderately affected man or animal often survives for a reasonably long lifetime, without the destruction of the bacillus in the system and without becoming proof against renewed infection by bacilli entering from without.

An acute infectious disease, self limiting and rarely or never recurring in the same individual, offers itself for safe and effective immunization, but with tuberculosis or glanders which may last in a chronic form for a lifetime, the preservation of the animal is too often but a means of perpetuation of the infection.

The considerations, which would condemn the application to animals of the tuberculin treatment of Koch, apply with greater force still to the *bovo-vaccine* treatment of the honored Von Behring. This provides for introducing, into the system, not only the chemical disease-products, but the modified bacillus as well. No wonder that the lauded immunizing action is partial and uncertain and that many of the animals treated show tuberculosis afterward.

It cannot be justly said that, in certain favorable cases it is impossible to induce an appreciable amount of intolerance and immunity, as this can be secured in measure by open air life, a generous oleaginous ration, a tonic treatment, the injection of oxygen, a freer circulation of opsonins, etc., but it can be truthfully affirmed that no one of these, nor all together, can be trusted to give an immunization which can be successfully employed on a large scale, as a state sanitary measure, for the purpose of securing a complete extinction of tuberculosis in the herds of a country. Whenever a state enters on an earnest work of extinction of the disease germ in animals, immunizing measures of this kind must be forbidden, or the alleged immunized herds must be carefully and permanently secluded from other animals.

It would be pessimistically wrong to deny the possibility of immunization against tuberculosis, but up to the present time we seem to have been working on the wrong track. We have by no means exhausted the probable resources of nature in this matter. The solution of the problem, if ever made, may turn out to be as simple as was the changing of the chemical reaction in gastric tympany or the arrest of the production of leucomaines in milk fever. Until we reach this wished-for goal, we must, in state sanitation, earnestly pursue the old, tried and approved methods of veterinary sanitary science and police, methods which have never failed us when intelligently, earnestly and honestly applied.

OLD AND NEW SCIENCE AND METHOD.

In carrying out old established methods, however, we must not for a moment forget nor ignore the new lights that are being constantly shed on the fundamental truths on which these methods are based. What is the life history of each infective germ? Is it alkali proof or acid proof? Is it ærobic or anærobic? Does it love light or darkness? What races of animals and what animal juices sustain its life, productivity, and virulence, and what do not? Is it a compulsory parasite or only a facultative one? Can it be maintained virulent, on, or in, vegetables, or other non-animal medium and, if so, on what? What soils, air, buildings and other materials of the environment favor its preservation and virulence? What rations and what agents taken into the animal system increase and what decrease susceptibility to its invasion? These are but illustrative examples of the necessity of the broadest and most accurate knowledge in dealing with any one microbe, and with sanitary expedients for its suppression.

Miserable failures constantly follow the lack of the new scientific knowledge. How many have been brought face to face with the sheep lung-worms diagnosed as tuberculosis? Or with œsophagostoma nodules which had been charged to consumption? Quite recently a most deadly extension of uncinariasis in a large kennel, was treated for a length of time as distemper. Too frequently the deadly uncinariasis or the strongylus (Ostertagi or Vicarius) are mistaken for dysentery.

On the other hand our modern, improved, laboratory methods of diagnosis have been allowed to crowd out, the older approved systems, and to leave a case in doubt which could have been quickly and accurately determined by such older methods. A mad dog, shot in the head, is examined for the Negri bodies, and for the neuroglia-cell proliferation in the plexiform ganglion, but naturally without any satisfactory result. The body of the dog has been buried and the question of rabies is left in doubt. In one such case I had the body exhumed, when the congested stomach, devoid of food materials and containing grass, straw, and wood, together with the empty, congested urinary bladder, coincided with a history of furious rabies in making diagnosis of rabies certain. In other dogs killed early, before the patho-histological lesions were developed, a safe diagnosis could be made on the stomach, bladder, and history. In such cases the old method gives conclusions which could be implicitly relied on, when the mere microscopic, laboratory examination is worthless. I hope no one will misunderstand me here. I stand for the new diagnosis quite as strongly as I do for the old. No one can afford to discard either the past method or the present, each is essential in its own proper place; each can furnish results that are absolutely reliable; both should be availed of when circumstances permit. But in the early stages of the disease or with the head crushed, the new laboratory method may prove valueless. And yet the laboratory method has so engrossed the modern mind that the practice now is to send the head only of an animal suspected of rabies. This cannot be too strongly condemned, betraying, as it does, the lack of a sufficiently comprehensive knowledge of the disease on the part of those in charge. Wherever available the microscopic diagnosis of the disease should be sought, but in no case should the microscopic diagnosis be omitted.

Tuberculosis.—Again no means of diagnosis is more reliable than the tuberculin test in suitable conditions. But the modern tendency has been to abandon all other methods in favor of this as an exclusive resort. To show the mistake of this I need only recall that this test may be absolutely unreliable in case of a beast with an abnormally high temperature: in a tuberculous cow in a state of marasmus: in a parturient or aborting cow: in the subject of any disorder liable to cause a rise of temperature apart from the tuberculin: in an animal which has been repeatedly tuberculinized: in an animal exposed to any cause of excitement or change of environment, which will tend to generate animal heat or restrain its radiation: or in any one of a number of other inimical conditions. The operator who bases his diagnosis on tuberculin alone must at times stand in pitiable helplessness. But the newer tuberculin tests must also be availed of. Vallee has shown that the skin of the tuberculous horse, ox or pig, shaved and painted with tuberculin, and, when dry, scarified to the surface of the derma, develops a congestion, exudation, œdema, and thickening, which is not shown in the sound animal. This lasts two days to several weeks. Fraud may be largely obviated by covering the part for 12 hours with a cloth cover attached around the edges. Vallee has further shown that instilling tuberculin into the conjunctival sac produces in 6 to 12 hours, weeping, ptosis, congestion and edema which last for two days or more.

In degeneration and especially cretefaction of tubercle the Röntgen ray is an available means of diagnosis, with the drawback that time, experience, skill, and elaborate apparatus and power, stand in the way of any general application of the method by the practitioner.

Again the agglutination test can be applied. and though it is not yet proved to be infallible it can be made a valuable accessory to the other methods.

These new tests have the advantage of doing away in large measure with that continued vigilance and exhausting labor, which have proved a serious temptation to the careless practitioner to slight the work and leave his results unworthy of implicit confidence.

Autointoxication is familiar in medical thought as never before, and offers a satisfactory explanation of many morbid states which were more or less mysterious to our forefathers. The poisonous principle is generated in the body cells, as in the case of leucomaines, in fermentations in gastric, intestinal, and other visceral contents, in disorder of secretory functions, in decompositons of secretions already made, in degenerations of tissues, in neoplasms, or in other morbid states. Until we become acquainted with all phases of organic and physiological chemistry, with the influence of different rations and interactions of different ingredients. with the effects of various regimens and environments, we cannot hope to understand the bearings of all forms of self-poisoning, nor be prepared to deal with them as expert physicians.

Parasitism is to a large extent a new field for the veterinarian of to-day. He must now recognize parasites not only as causes of irritation, depletion and exhaustion, as interfering directly with the functions of the organs they invade, but also as contributing to the production of toxic matters which interfere with vital functions, and, still more important, as the bearers of microbian infections of the most dangerous kinds from one animal system to another. Lice and fleas, mites and ticks are to-day recognized as bearers from animal to animal of microbian infection. This applies, not alone to the blood suckers, and to insects that bite the skin, but to such as, like the house fly, transfer on their pad-like palpi, the infection from sore to sore, from mucosa to mucosa, or from infected animal product to food or water. Some carry from victim to victim embryos of worms; some entertain a cestoid larva to be swallowed by another animal in which it may develop into a mature tapeworm, some entertain and transfer a plasmodium, a piroplasma or a trypanosoma to the blood of a new victim, some generate in addition a venom which, instilled with the microbe into the wound, depresses the vitality of the defensive elements in the tissue of the victim and lays the latter open to invasion. The great extension of many of the resulting diseases during hot weather, when invertebrates abound, are often largely due to such intervention of insects.

Turn to worms and we meet with hundreds of species and varieties which not only invade the bodies of their respective hosts, but often introduce more or less deadly infections as well. The many worms that as embryos burrow into the tissues and vessels are the most liable to infect, next come the large class of blood suckers that make breaches or virtual infection channels in the mucosa, together with a large number of tæniæ, and other helminthes with armed heads. But it is impossible to exonerate the non-burrowing and non-biting varieties, as their embryos are liable to enter the ducts of intestinal glands, and the alveoli of Peyer's patches and the solitary follicles, where infection can rest and multiply until it can enter the system as microbe or microbian toxin. Cases of tetanus of obscure origin, of appendicitis in man, and of inflammatory ulcerative and general disorders are now traced to such causes.

These give us faint glimpses of wide fields that have been too much neglected in veterinary medicine, sanitation and education, but which demand in the future earnest cultivation by the profession. Parasitism has become an important study, accessory to the vast modern field of bacteriology and bio-pathology, and one that can no longer be left to neglect nor treated lightly.

Surgery has through asepsis and antisepsis attained to triumphs undreamed of in the past: it is now a familiar thing to open the abdominal cavity, even in the horse, to perform plastic operations on the bowels, the joints, or the great nerve centres; to arrest hemorrhage by somatic products like adrenalin, or chemical ones like lime salts; the long standing opprobrium of paralysis of the arytenoid muscles has been largely removed by obliteration of the laryngeal ventricle by peeling off its mucosa; diagnosis of lameness has been simplified by the use of electricity, cocaine or stovaine, and the operator commands the situation in many cases where formerly he stood helpless.

Physiological therapeutics is coming to the front in different lines and gives promise of great future usefulness. The possibilities of immunization have hardly been touched on as yet, but we are constantly learning more of the conditions in which it may be splendidly utilized, and those that antagonize achievement. Attention is now being given to agents and conditions that favor phagocytosis, and the group of *opsonins,* so called because they prepare the food for the phagocytes, is prominently before the scientist. These last are very varied, differing with each disease, with the germs and even individuality of each victim, and with each invading microörganism, and the as yet somewhat indefinite knowledge of them is leading forward in the lines of diagnosis (by agglutination), of prognosis, and of therapeutics.

Accessory to the action of the opsonins is the improvement in the circulation of the tissues invaded by the bacteria, and whether this is affected by the time-honored fomentations, frictions, rubefacients or massage, by Bier's method of dilating the capillaries by cupping or damming back the blood, by Wright's system of lessening the plasticity of the blood and lymph by medication, or by other means, the question of success or failure will often depend on the skilful, and well-adjusted application of such indispensable accessories.

A new and promising departure in therapeutics consists in the introduction of electrolysis. It has long been known that acids and radicals are evolved at the positive electrode, and bases at the negative one. Now we can avail of this to set free chlorine in a tumor from a golden needle varnished except at the point; the tissue is coagulated and destroyed and finally absorbed. Pure nascent iodine is similarly introduced into enlarged glands where the relatively very minute amount, being uncombined and unweakened, acts without irritating yet with great effect. In neuralgia and rheumatism salicylic acid can be introduced into the tortured tissue in infinitesimal amount, giving prompt results. In anærobic infection oxygen can be liberated in the tissues to the discomfiture of the microbian invader. Why may not this local treatment by electrolysis become the true line of triumph over many intractable disorders? It promises to furnish a far safer and more effective local treatment for many affections which have been long met by a general, and, sometimes injurious saturation of the entire system with drugs. But, to apply it, the practitioner must be an accomplished chemist, toxicologist, therapeutist and electrician.

VETERINARY EDUCATION.

Veterinary education has become a burning question, which cannot be extinguished, but blazes up at each annual meeting as well as in our faculties' organization. In one word it may be asserted that the dispute cannot be settled until we advance the requirements for admission to the profession approximately to those exacted in the sister profession of human medicine. After many futile attempts, extending over as many years in the Empire State, we twelve years ago sought and obtained a statute adapted from the law then in force for regulating the practice of human medicine. It provided similar requirements for matriculation, a curriculum of three years which must be approved and accepted by the Education Department of the State Government, a degree conferred by such a State-endorsed college, and a license to practice conferred after successful examination by the Education Department. This remained inferior to the medical requirements in that it imposed a curriculum of but three years instead of four. This statute set the Empire State apart from and above all others in its veterinary education, and soon complaints poured in on all sides. Graduates of schools having practically no matriculation requirement, and but ten or twelve months of college study, joined with those having a fair entrance requirement and a college course of three years. It was claimed that any one having a veterinary degree from any college should have liberty to practice in New York, a strange demand, truly, seeing that the State must then grant to aliens what she denied to her own citizens. Then it was claimed that the old practitioner from another State should be welcomed to practice in New York without evidence of preliminary school education, and without an examination to test professional acquirements. This was worse than the first claim. It would admit the most poorly educated man, with the shortest and most imperfect college course, or with none, if he had spent some years in alleged practice in another state. Then came the plausible demand for reciprocity. The license granted by an official examining board in one state must be accepted in every other state including New York! Again it was urged that a graduate of a three-year veterinary college should be examined for license in New York without fulfilling the New York requirements for matriculation. Anything, no matter how illogical, to break down the New York statute. In every case the outsider proposed to grant special privileges to veterinarians educated or practicing outside the State, while denying them to those educated and graduated within the State.

In seeking reciprocity or a *modus vivendi* in such a matter, there are but two possible methods: either grade the requirements exacted in outside states up to the standard of New York, or grade the New York standard down to that of the lowest outside. The real question is, *shall we grade up, or shall we grade down?* Must the veterinary profession keep pace with the advance of the twentieth century, or can it afford to recede? The latter course has been favored in what might well be considered as unexpected quarters. At the last annual meeting of the N. Y. S. Veterinary Medical Society a motion was introduced looking toward the reduction of the standard of veterinary education in New York. This was fortunately defeated. At a recent meeting of the Veterinary Medical Association of New York City, a motion disapproving of our State law was carried, after appeals had been made, by its known enemies, invited from outside the State, while New York State advocates of the law had been left out.

Every one must be allowed to act out his own convictions in this matter, but for the same reason any one with enlightened judgment is in duty bound to give a reason for the faith that is in him, and with all due respect for the views of others, to lay before them the reasons for thinking otherwise than they do. Under present conditions I feel that I would be false to the trust you have reposed in me, if I should seek to evade such a manifest call of duty.

DEMAND FOR BETTER SANITARY SERVICE.

More than ever before the world needs the sanitary services of well educated veterinarians, and is becoming increasingly solicitous for the highest grade of such service. This is shown in the statutes enacted by state after state for regulating veterinary practice, and for securing to the stock owners a guarantee of education and skill on the part of its veterinary practitioners. It is shown in the increasingly searching examinations imposed on candidates for admission to veterinary service in the army, in the Federal Civil Service, in state, municipal and district service. The opponents of the higher education should study the results of such examinations in their relation to colleges having the higher requirements, and to those having the lower. They would find that the successful men were, in a very large majority of cases, the representatives of higher education and preparation, while the unsuccessful represented the lower grades in both. I invite the comparison. I am dealing in no *a priori* argument. I appeal to the records.

I am convinced that if a false sentiment for colleges that have allowed themselves to be left behind in the race of improvement, and the supposed pecuniary interests of such colleges, could be eliminated from the discussion, few if any of its present inveterate opponents would longer object to even the New York State law on the ground of excessive requirements.

The increasing demands exacted of aspirants to public veterinary service mark an epoch in which veterinary education must respond to such demands, or be relegated to neglect. The accomplished pathologist and sanitarian of animals is alone worthy of public confidence as a guardian of public health where veterinary sanitation is involved. The veterinarian is the only logical or safe officer to be charged with the control of animal diseases that are dangerous to man, yet, if the public is to entrust him with this duty, it must be first assured that the veterinarian in question is equally accomplished in all that pertains to these diseases in the lower animals as the physician is in regard to the same affections as seen in man. If, on the contrary, the veterinarian has had but a scanty school education, and is quite devoid of knowledge of those modern tongues in which the most recent advances are often first recorded, and if he has had a professional curriculum of but ten, twelve or eighteen months, with practically no laboratory training, can he complain if his special merits and experience are set aside in favor of the medical man who has had at least a high school education, followed by four years of study in a medical college including extensive laboratory training? If we would assert our fitness and right to deal, in the case of animals, with diseases common to man and animals, we must be ready to show the general public that our education and training will suffer nothing by comparison with that of the modern medical graduate. We should be honest with ourselves in this matter, basing our claims on a better training and a special fitness for dealing with these diseases as they occur in the lower animals, but no less on a training in the pathology, etiology, and prophylaxis of every such communicable disease, as clear and definite, as profound and accurate for the affection in animals, as is possessed by the best medical man with reference to the same infection or malady in man.

Complaint has been made that official test examinations lack in the important element of direct personal contact between examiner and examined. It cannot be denied, however, that the accomplished man can furnish satisfactory written answers, while the uneducated candidate cannot. The practical test was omitted from our New York Statute because the latter was based upon the medical law of license, and because its insertion would have impaired the force of our plea for equivalent regulation, and might have entailed one more defeat of our measure. But, even as it stands, a practical test is imposed. The candidate must be a graduate of a veterinary college approved and registered by the Education Department of the State Government as being up to the required standard. No such college worthy of the name will fail to apply the test of practical work and examination. For the college that does its duty the practical test should carry no dread, while to the candidate of the college which fails in its duty, both written and practical examinations are perilous. We have not yet reached perfection by any means. But we have taken a most important step: we are now ready to welcome the practical test in the examination for license as a further step in advance: but never can we endorse the abandonment or depreciation of our written entrance oı licensing examinations.

We all know how the average low estimate of the veterinarian has so often led to the employment of medical men to do veterinary state work, and how much the community has suffered from this attempt to block a square hole with a round plug. Even our New York Agricultural law provides that "the commissioner may employ such and so many *medical* and *veterinary* practitioners . . . as he may deem necessary." Precedence is given to the *medical man*, and, if this is the case with our exacting veterinary requirements in New York, what may be expected in the case of states with incomparably lower requirements?

But it is not in the matter of communicable diseases alone that the veterinary official is called upon to protect the public health. He must be capable of recognizing the presence in animal food of the toxic products of disease in the lower animals, whether these may be toxins from disease germs, leukomaines or albuminoses from the disordered body cells and tissues, or the poisons that are produced by the growth of saprophytes and the occurrence of decomposition or metabolism. To determine the existence of these, or of any one of them in an individual case demands the education and skill of the comparative pathologist, and not simply the restricted view of the physician instructed along one line, and in the pathology of one genus of animal only. But the logic which reserves this field for the expert veterinarian only remains valid so long as the veterinarian is at least as much an expert in the whole field of the pathology and sanitation of the lower animals as the physician is in the case of the pathology and sanitation of the human being. The mere name of veterinarian is not a philosopher's stone to transform the base-metal ignorance of the bearer into the true gold of science and skill, and unless that name is upheld so as to express the equivalent of the best of the twentieth century expert knowledge of veterinary pathology it can only become a term of reproach, and the unfounded claim, which is sought to be based on it a mark of merited contempt. To successfully retain the sanitary functions claimed for him, the veterinarian must be really an expert in all that pertains to animal pathology: in geology, soils, waters, sites, climate, forages and all botanical products; in genera, feces, and breeds of animals, their dietetics and ameliorations; in buildings, ventilation and sewerage; in the physiological chemistry of the animal body and its products, in its metabolism as affected by food, air, exercise, electric storms, disease and every conceivable condition that will affect health or function; in the microbes which are the primary causes of fermentations and the chemical products which are the immediate factors in the fermentative changes, in the thousand conditions which affect the food supplies of man and beast.

VETERINARY EDUCATION AND ANIMAL HEALTH.

All this bears directly on the purely veterinary work of the restriction and extinction of contagious, parasitic and other communicable diseases among animals themselves. This is, and should be, the exclusive field of the expert veterinarian and the veterinarian alone. There is here no room for the sophism that because an infection is communicable to man the physician of man is called upon to deal with that infection at its source in animals, though he is profoundly ignorant of its phenomena, course, pathology and prophylaxis in our zoölogical inferiors. From the plagues that are restricted to the lower animals we need have no apprehension of the colonization of a living germ in the human system and of its propagation from man to man in the form of a pestilence. In all such purely animal diseases the main perils to man consist in the deficiency or deterioration of meat or milk, the abundance and quality of which are essential to the well-being of the community. Such deficiency may deteriorate the health of the human population and largely undermine the local or national prosperity. But the remedy must be found in an appeal to the veterinary experts who are highly educated in the individual animal plagues which cause such widespread destruction. If the people or the government defy science and reason and seek help from inexperts, from laymen, from the medical profession, or even from ignorant and untrained members of the veterinary profession, only one outcome can be expected, and that an unhappy one.

VETERINARY EDUCATION AND ANIMAL INDUSTRY: POLITICAL ECONOMY.

But again,—the comparative pathologist and sanitarian, dealing with our vast possessions in domestic animals, estimated at $2,000,000,000 in value, is a factor in political economy which cannot be lightly set aside nor undervalued. In dealing with the great aggregate of domestic animals, he holds in his hands the future prosperity of the nation, namely, the economic production and maintenance of the live stock, the enrichment and fertilization of the soil by their product, the abundance and cheapness of food materials, and the consequent encouragement and stimulation of every human enterprise. He has primarily to do with the live stock interests, and these interests interpose a limitation which must largely dominate his course. The primary rights of the stock owner cannot be lightly invaded. He is one of the most important factors in the economic world. His property cannot be confiscated for the public good without due process of law based on an assured prospective public profit to be derived from the act, nor without a righteous indemnity for the possessions taken and the business infringed. To meet this the expert veterinarian must be fully and definitely instructed in existing statutes bearing on the subject, and he must have a clear idea of what new statutory measures may be needed to render his work effective under special conditions of locality, animal industry and trade. That fundamental principles bearing on such sanitary work have been too often shamefully ignored in the past, is no reason why a similar injurious unreason should dominate in the future. We are educating the veterinarian for the twentieth century, not for the nineteenth, nor eighteenth. If our veterinary graduate cannot grasp the vital questions of to-day and to-morrow, we have failed in our effort, and our alumnus is destined to be set aside as an obsolete figure.

If I can rightly interpret the signs of the times we are entering on an era of reform, in which many of the hoary wrongs of the past are to be righted, in which the more favored place-holder is to be set aside for the public servant best fitted for the duty demanded; and in which the faithful fulfillment of the trust will be the condition of continued employment. Facing this future can we hope or expect that veterinary medicine will secure and maintain its proper place in the community unless we set a higher standard of attainment than we have in the past? In all future sanitary work the stock owner's interests must be allowed full representation and influence, as must no less the interests of the general community and of the coming generations, and in harmony with all and giving just balance to each, must be the work of the official veterinarian, whose command of the situation will be exactly in ratio with the acknowledged soundness and depth of his expert acquirements. The scientifically educated agriculturist of the future will see no use in this field for the poorly educated veterinarian, recognizing that he is lacking in the science and economy in which he himself has been instructed.

VETERINARY EDUCATION AS ACCESSORY TO LABORATORY WORK AND RESEARCH.

The busy practitioner, no matter how highly educated, can not always carry out necessary laboratory methods. He cannot always make analysis for the common inorganic poisons, much less for the more subtile organic ones; he cannot always make blood counts, nor bacteriological, protozan, entozan nor opsonic blood examinations in questionable cases; he cannot always differentiate microscopically between tuberculosis and actinobacillosis; he cannot in all cases demonstrate the presence of Negri bodies in the brain, and of proliferating cell groups in the capsules of ganglionic nerve cells; he cannot have by him the means of applying the Röntgen or Finsen rays; he cannot perhaps resort to inoculation tests in cases of difficult diagnosis, and in a hundred other cases he may not be able to enter personally and unaided into the field where modern science calls. But he must have an intelligent acquaintance with one and all of these methods, and know when he can call in assistance from the laboratory or elsewhere to clear up the uncertainty of his case. And he must know how to secure and ship material in a condition in which it may be utilized on arrival with reasonable prospect of success. How often now is material delivered in a condition which renders it absolutely useless for purposes of investigation or diagnosis, and a priceless opportunity is absolutely and lamentably lost.

In veterinary as in human medicine the whole field cannot always be most fully, accurately and profitably exploited by the one practitioner. There is, and will always be, room for the specialist, and for the man of the largest, broadest and most accurate knowledge and the widest experience. But the value of expert consultation will depend largely on the theoretical knowledge of the practitioner at whose instance he is called in, as he by his opportunities of observing the antecedents, environment, inception, symptoms and progress ought to be able to protect the expert against hasty or unwarranted conclusions. If, therefore, the regular attendant should lack somewhat of the experience, and accurate and acute knowledge of the expert, he cannot afford to be deficient in the theoretical acquaintance with the whole field of veterinary science. It is only in this way that he can justly and permanently claim the provision of the State law which protects him in his practice.

THE STUDENT'S RELATION TO THE HIGHER EDUCATION.

Preliminary Requirements.—It is indisputable that success in professional studies is largely dependent on the facilities that can be provided for acquiring a mastery of the subject in hand. By a training in English and philology the nomenclature in medicine is easily appreciated as regards its root, root-meaning, and applicability. A fair knowledge of Latin and to a less extent of Greek, or a study of the root words in Latin and Greek with their derivatives in English enormously facilitates medical study. Without this each word and its meaning must be retained by a hard effort of memory, whereas with it the primary root-meaning is transparently on the surface, and recognized without effort. It follows without argument that of two minds with equal native power, more will be accomplished by the one which is not subjected to the conscious and severe effort of memory with each word and which therefore escapes from the fatigue and exhaustion which is the inevitable lot of the other.

In the same way the man is better fitted for his work who can read its literature in one or more of the modern tongues in which much valuable material is earliest, most fully, and most correctly printed. He can escape the drawbacks of delay, faulty translation and proof-reading which beset the less liberally educated student.

The student who enters a present-day class in chemistry is seriously handicapped if unacquainted with algebra and unable to construct and use algebraic formulæ.

The more we improve our veterinary curriculum, the more imperative becomes the demand for a better preparatory education, for the greater the number of subjects to be mastered, the more imperative it is to be able to do this with a minimum of effort and with less mental strain and exhaustion.

As the student advances, the subjects and strain increase, and in research the disadvantages become more and more patent.

After strenuous application and successful work he is liable to find that the subject has been already elucidated and his aspirations and hopes of credit and fame are blasted. Even if the first to make a discovery, it is difficult for him to ascertain how much had been already known, and to place his work before the public and to secure for himself the measure of credit to which he is justly entitled.

The rapid advance is not unattended by danger even to the student. The worship of new methods naturally obscures the old, and threatens to cast them into oblivion. The laboratory worker, of necessity almost a young man, and little familiar with the old, is tempted to train students in a one-sided track, and much of the lore of the past, which the modern can never fully supersede, is in danger of being lost. Let us not forget Latin aphorism: *festina lente* (*hasten slowly*), let us not abandon our priceless *armamenta* of the past, but let us not fail to add the equally priceless discoveries of the present. To lag behind the advances of our age would be suicidal; to carelessly abandon the treasures of the past, which have to-day lost none of their real value, would be unspeakable folly. Science should be our guiding star, but we should strive at every step to preserve the undimmed light of the past and combine it with the shining effulgence of the present.

THE EXPERIENCED PRACTITIONER'S RELATION TO A HIGHER EDUCATION.

The raising of the requirements for admission to the profession cannot fail to have an elevating and beneficial influence on the profession as a whole. It means that from this time on the legal accessions to our ranks must be men of mental capacity, grasp, and training, men better fitted to deal with such problems as confront us in our modern life, and instructed in the whole range of modern comparative medicine, men trained to grapple with the multitudinous questions of the most varied veterinary practice, in city or country, at home or abroad, with breeding, selection, development and training, with dietetics and hygiene, with infection and its extinction and exclusion, with trade conditions and inspections in abattoirs and in transit, with transient and permanent immunizations, with the preservation and sanitation of milk and other animal products, with all conditions that make for improvement, physiological activity, rapid development, and profitable animal husbandry, with all toxic, inimical, or restrictive conditions, with every question that makes for good or evil, for advancement or retrogression in live stock industry. Much of this the old practitioner has learned in his well-spent life; much also he can only acquire, like the student, by assiduous application in the study or laboratory. He has a certain advantage in a long and familiar acquaintance with the general phases of the live-stock industry, which like the preliminary education of the student, though in a different way, renders it easy to seize, understand and utilize much of the newer medicine, but he must not allow himself to grow old, he must not indulge in any lax nor *laissez faire* habits of life, he must remain a student and an earnest one to the end of his days if he would not be left behind in the arduous race of the future.

As the profession becomes more cultivated and more leavened by modern science and skill through the accessions of up-to-date trained men, the public estimate of the profession as a whole is elevated, and this confidence and trust extends more or less to every member. There is often a not unnatural resentment, on the part of an old practitioner, at all this restless activity, at this reaching forward after the newer and better, at this disturbing of his settled habits and contentment. But it is one of the features of this marvellous age that no one can be allowed to stagnate, the spirit of advancement is in the air and we must press toward the van if we would not be left behind.

Stagnation in the veterinary profession means death, and no vested interests, no kindly sentiment toward an old college, which has failed to keep up with the advance of modern medicine, can be allowed to stand in the way. Modern medical and veterinary education becomes increasingly and ominously expensive, the costly laboratories must be maintained, and their no less costly supervision, the hospital and hospital appointments, the rooms for research and experimental observation.

All advanced medical colleges recognize this fully. They no longer profess to maintain the expenses by students' fees. Private endowment or municipal or state support are necessary conditions of existence. If medicine is one, the veterinary branch can no more than the medical be left to an insufficient support. We see the recognition of this on all sides, Ohio, Washington, Kansas and Iowa have appropriated state funds for the teaching of veterinary medicine and each offers a veterinary degree. Michigan, Missouri and other states have a similar purpose in view. New York in 1895 furnished $150,000 to establish a veterinary college, with $25,000 a year to conduct it, increased in the last legislature to $30,000. Pennsylvania has virtually secured from state and private benefactors $500,000 to be made available for veterinary education and investigation. The Chicago packers have given $250,000 for veterinary college buildings and equipment, and the state legislature passed a bill providing $30,000 a year for their support. These movements indicate that the public is waking up to the economic advantages of veterinary medicine, but they indicate even more fully the public appreciation of the call for advancement of the profession and the elevation of its standard. It is for us, the great body of the profession, to rise to the occasion and add our impetus to the common progress. Private, proprietary veterinary colleges have been in the past sources of income and prosperity. That day is well nigh past. Hereafter they can no longer stand on the old ground and follow the old methods. They must secure through private or public benefactions the means of bringing their system up to the requirements of the day or they must be swept away in the onward march of twentieth century progress. Any hesitation to go forward, or any wavering or disposition to go back from an advance position already attained, must be to the disadvantage of their students, and to the lowering of the reputation of the entire profession which will be estimated according to the status of the imperfectly educated men added to its ranks; it must contribute to lower the estimate set on every regular practitioner in the land; it must invite to odious comparison of us in presence of the sister profession of medicine—turning aside from us to the physician all important work in comparative sanitation; worse than all, it must rob us of the confidence of the future stockowner.

We cannot afford to shut our eyes to the fact that, more than ever before, our great agricultural community is being liberally educated at public expense. New York is just completing at Ithaca a splendid agricultural college at a cost of $250,000 and has appropriated $150,000 for its next year's maintenance, to be added to the liberal sums previously provided by the state and nation. Not satisfied with this, the same state has appropriated $60,000 for an agricultural college at Canton, St. Lawrence County.

Matriculation in the agricultural course demands four years of successful high school work and the college course for an agricultural degree requires four years more of successful work in college. Then fellowships are available to enable the promising alumnus to continue his studies for two years longer, six years in all, with the object of securing an advanced degree, so that our future agricultural alumnus promises to be a very accomplished person.

The federal government spends many millions yearly in the work of agricultural education and progress. A number of states, in the West especially, give to agricultural education a fixed percentage of the taxes, so that as time passes and states develop in material prosperity, the funds available for this purpose will increase in ratio. There is thus assured, for the future, a progressive increase in the means and quality of agricultural education.

Can we hope that the agriculturist, educated in this liberal way, will respect or support a profession which attempts to block the wheels of veterinary progress, or which would vote for a return from an advanced and advancing position to the imperfect and outgrown education of a time when our universities disdained to have a chair of agriculture, of veterinary medicine, of mechanical or civil engineering, or even of chemistry?

We stand to-day at the parting of the ways. The opportunity is before us to advance with the times; to crowd forward with the onrushing army of progress; to hold our place side by side with the newer medicine, and still newer agriculture; to keep abreast with modern and rapidly advancing sanitation. If we fail to seize our opportunity, we doom ourselves to decadence, to neglect, to be brushed aside while others enter into our rightful heritage.

The wise choice of the profession as a whole must be the outcome of the choice of the individual practitioners. As we cannot delay the oncoming tide it is the part of wisdom to avail of it for our own profit. The movement for a higher standard seeks in no way to push aside the experienced practitioner. It reserves to him all the rights, privileges and immunities which he ever possessed, while it brings him the additional honor of belonging to a profession that can no longer be despised or neglected. He can take his place side by side with the members of other learned bodies. It is the privilege and duty of every worthy practitioner to add to his long accumulating experience and skill a personal study of the newer science, so that in his case the new honor will not be a reflected one only, but one based as well on added personal worth. The man who has worthily filled his professional sphere through a lifetime should find no difficulty in maintaining an estimable place in the future veterinary medicine.

The greatest danger to the veterinary profession is the apathy of the practitioner. This association has 600 members when it might very well have 6000. The 600 include many of the best and most ambitious practitioners, yet in numbers it can hardly be called representative. Thus the licensed body of practitioners fail to show that jealousy of illegal practice which the spirit of the law demands. Leaders amongst us claim that if a man cannot drive out the unlicensed man, by opposing to his pretensions his own greater skill, that all appeal to the law is useless. They forget the claim of the quack that he could always count on nine fool clients for the one which the regular practitioner secured. They further forget that the country is literally nostrum-ridden and that no one is so financially prosperous as the shrewd and unscrupulous purveyor of patent medicine. I make the further charge that able and prosperous practitioners violate state laws in spirit and in fact, in employing as active assistants men who have neither degree nor license, and some even open offices at wide distances apart under their own names, but where the veterinary practice is conducted by non-licensed men, who pose as their assistants. " It is an ill bird that fouls its own nest," and no less is he a blameworthy beneficiary who despises the generous recognition and protection given by his state and who deliberately sets himself to undermine the statutes made for the protection of his profession. For such an ungrateful recipient there is needed another statute, with a merciless penalty for the ingrate.

THE HIGHER STANDARD OF EDUCATION IN RELATION TO THE SUPPLY OF VETERINARY GRADUATES.

The criticism has been made that the higher standard of education in New York has driven away many prospective students who would otherwise have sought to enter the profession, and that the actual graduates are not numerous enough to fill the constantly occurring gaps in our ranks. This always happens when higher entrance requirements are imposed, as candidates require a year or two more to prepare for admission. But just as constantly do the numbers increase again, and even exceed the former classes entering on lower requirements, provided that the education offered is of a better kind. Our experience in the New York State Veterinary College fully sustains this rule. In 1904 on 24 academic counts we matriculated 58 freshmen, full as many as we could do justice to with existing equipment. In 1905, on 48 academic counts we had but 19 freshmen, and there was raised a loud hue and cry against the higher requirements. In 1906, on 60 academic counts (about equal to 48 of the year before), we matriculated 32 freshmen, a larger number than we had matriculated in 1902. For 1907 I can only say that applications are largely in excess of those of 1906, and there is every indication that we must soon appeal to the state for a material increase in our appropriation, or cut down our classes by imposing the long anticipated and needed fourth year of veterinary college work. Our remarkable increase, it must be noted, is being steadily made in the face of the offers of colleges outside New York to take students on a common school examination or less, and to graduate them after a curriculum of 10, 12 or 13 months, as compared with our 27 months' course. In the face of every drawback our course has been fully justified by the result, and the outcome cannot fail to be beneficial to all concerned. The science will be advanced and elevated, the client will get better service for which he can afford to pay more liberally, and the practitioner will gain a higher respect and secure a better pecuniary reward. If our object were merely to crowd the class rooms and secure a temporary reward from students' fees the aim might be still attained for a few years longer, but it would be gained at the expense of lost reputation for the profession, of estrangement of the advancing agriculturist, of the steady diminution of the practitioner's income, and finally of the "turning over of our vineyard to others who would bring forth the fruits thereof."

This may be affirmed as to the duty of the American Veterinary Medical Association in this matter. First, it cannot dictate to states what they shall do. It can exert a moral influence only. Second, it can set a standard for admission to membership in its own body, and this should ever aim by grading up: never at grading down. Third, its aim should nevertheless be to extend greatly its own membership so as to embrace all worthy members of the profession on the continent, and thus to increase its own influence. A close corporation of mutual admirers is not the ideal. The Association must be truly *American,* as the name implies. Fourth, uniformity of standard in education and graduation is desirable, but any attempt to lower a standard already locally attained is a fatal move. This association can afford to admit to its membership worthy and able men who have been denied the privileges of a good preliminary and college education and who have risen above their disadvantages and made their mark, but it cannot use its influence to lower by an iota the high standard established in a state.

VETERINARY CIVIL SERVICE.

The advancement of the Veterinary Civil Service is a source of satisfaction to every right-minded veterinarian. The great extension and improvement of meat inspection places the United States in the very fore-front of the nations in this important sphere. As in every other field there is much room for advancement, such as in the line of intimate coöperation of nation and states in tracing and dealing with dangerous infections and parasites, indigenous and exotic, in every locality where it has become colonized. This demands that each individual state shall be brought up to the level of the federal government in the matter of veterinary service, so that as far as sanitary science and police is concerned they may complement each other and act as one body for the extinction or restriction of communicable diseases. The same is true of municipal and local veterinary sanitary service. Our state autonomy forbids the placing of the entire veterinary civil service under the direct control of a central bureau, but every state, municipal or district organization should be so affiliated with the federal bureau that the work as a whole will prove as effective as if it were all directed by one central head. As in Europe a beneficial international comity is maintained, so in America a federal and interstate trust and statutory coöperation is essential to a rational practice and abundant success.

VETERINARY SERVICE IN THE ARMY.

The status of the army veterinarian has long been an unsatisfactory one, but delay should not breed despair. Last year there seemed to some a reasonable ground for hope of a successful issue to the bill before Congress. But as it turned out, the bill with all its good qualities, contained an element of injustice to faithful veterinary officers that could only be rectified by an amendment which would inevitably defeat the measure in the Congress then sitting. It further developed that the bill before the House would fail to receive attention, not from any demerit of its own, but from simple lack of time, so it was deemed best to bear out our ills for one year more, and then come up with a bill which would harmonize all interests, securing the approval of the General Staff, the Secretary of War, the friends in Congress, the army veterinarians, and the great body of the veterinary profession.

But I have held your attention too long. Our profession in America stands as never before, in numbers, in skill, in public estimation; our association meets in the center of the United States, in the great Mississippi Valley, where it can draw upon a vast body of veterinary practitioners, each zealous for the good of veterinary medicine; we have in the program of our meeting papers on a great variety of subjects of urgent importance, and I bespeak for these the calm and judicial consideration which should make the Kansas City meeting a beacon of protection and real progress for our advancing future.

President Law: The next order of business is the calling of the roll and the reading of the minutes of the last annual meeting.

Secretary Lyman: Mr. President, I move that the records kept at the door where the members are requested to register, be substituted for the roll call. Seconded. (Carried.)

Secretary Lyman: Mr. President, I move that the reading of the minutes be dispensed with and that the records as published in the annual report and as kept by the Secretary be adopted as the official minutes of the last annual meeting. Seconded. (Carried.)

Dr. S. Stewart at this point made an announcement of the program which had been laid out for the entertainment of the visitors. It is embodied in the report of the Committee of Local Arrangements. See Social Features.

On motion the convention adjourned until 2 P. M.

Tuesday Afternoon,
September 10, 1907.

The convention was called to order by President Law at 2.30 P. M.

President Law: The first in order is unfinished business, and, as the Secretary informs me that there is none, we will call for a report of the Executive Committee.

Secretary Lyman read the following report:

REPORT OF THE EXECUTIVE COMMITTEE.

A special meeting of the Executive Committee was held in the parlors of the Coates House, Kansas City, Mo., September 9, 1907, at 11:15 A.M., W. H. Dalrymple, chairman, presiding.

MEMBERS PRESENT: Doctors Dalrymple, Law, Lyman, Merillat, R. R. Bell, G. R. White, Williams, and Brenton. By appointment of the President, Dr. W. H. Hoskins.

MEMBERS ABSENT: Doctors Reynolds, D. S. White, Monsarrat, and Jensen.

VOTED: That the Executive Committee recommended that the By-law limiting the date on or before which applications for membership must have been received in order to be voted by the convention be suspended during this meeting.

On motion duly made, seconded, and carried, the following persons were recommended to the Association for election to active membership:

WM. A. AXBY, D.V.S., D.V.M. (Ohio Vet. College, 1895, Cincinnati Vet. College, 1905), Harrison, Ohio. Vouchers, E. H. Shepard and J. V. Newton.

CHARLES BAYNES, M.D.C. (Chicago Vet. College, 1902), Tacoma, Wash. Vouchers, S. B. Nelson and K. W. Stouder.

JOHN A. BERG, M.D.C. (Chicago Vet. College, 1905), Pender, Neb. Vouchers, V. Schaefer and Chas. A. McKim.

DAVID L. BOLZER, D.V.S. (McGill Univ., 1892), Cambridge, Mass. Vouchers, E. C. Beckett and Francis Abele, Jr.

RICHARD F. BOURNE, D.V.S. (Kansas City Vet. College, 1906), Kansas City, Mo. Vouchers, S. Stewart and A. T. Kinsley.

CHARLES ARTHUR BOUTELLE, D.V.S. (McGill Univ., 1895), Newton Center, Mass. Vouchers, E. H. Holden and Benj. D. Pierce.

P. H. BROWNING, M.D.C. (Chicago Vet. College, 1903), San Jose, Cal. Vouchers, C. W. Fisher and A. R. Ward.

HARRY D. CHAMBERLAIN, V.S. (Ontario Vet. College, 1887), Belvidere, Ill. Vouchers, A. H. Baker and L. A. Merillat.

LLOYD CHAMPLAIN, D.V.S. (Kansas City Vet. College, 1905), Kansas City, Mo. Vouchers, S. Stewart and F. F. Brown.

GEORGE J. COLLINS, D.V.S. (Kansas City Vet. College, 1906), West Point, Neb. Vouchers, V. Schaefer and Chas. A. McKim.

ROBERT E. COLLINS, V.S. (Ontario Vet. College, 1893), Memphis, Tenn. Vouchers, G. R. White and Jos. Plaskett.

CLARE V. CONNELL, V.S. (Ontario Vet. College, 1894), Decatur, Ind. Vouchers, A. W. Bitting and R. A. Craig.

ERNEST L. CORNMAN, V.M.D. (University of Penn., 1900), Marietta, Pa. Vouchers, C. J. Marshall and S. H. Gilliland.

Carl Cozier, M.D.C. (Chicago Vet. College, 1905), Bellingham, Wash. Vouchers, C. S. Phillips and L. A. Patric.

C. Price Dixon, D.V.S. (Ohio Vet. College, 1893), Charlottesville, Va. Vouchers, Jno. Spencer and R. R. Clark.

James S. Donald, V.S. (Ontario Vet. College, 1886), Bay City, Mich. Vouchers, S. Brenton and G. W. Dunphy.

O. E. Dyson, M.D.C. (Chicago Vet. College, 1891), Chicago, Ill. Vouchers, Joseph Hughes and L. A. Merillat.

Cyrus B. Estey, V.S., M.D.V. (Ontario Vet. College, 1905, McKillip Vet. College, 1906), St. Cloud, Minn. Vouchers, Chas. E. Cotton and S. H. Ward.

William C. Ferguson, D.V.S. (American Vet. College, 1893), Paterson, N. J. Vouchers, W. Herbert Lowe and J. Payne Lowe.

C. H. Gaines, D.V.S. (Kansas City Vet. College, 1906), Chilowee, Mo. Vouchers, S. Stewart and A. T. Kinsley.

Ward Giltner, D.V.M. (New York State Vet. College, 1906), Auburn, Ala. Vouchers, C. A. Cary, James Law and R. P. Lyman.

John W. Haffer, V.S., M.D.V. (Ontario Vet. College, 1903, McKillip Vet. College, 1906), Paterson, N. J. Vouchers, W. Herbert Lowe and J. Payne Lowe.

Thomas W. Healey, M.D.C. (Chicago Vet. College, 1906), San Jose, Cal. Vouchers, Carl W. Fisher and A. R. Ward.

Thomas S. Hickman, D.V.S. (Kansas City Vet. College, 1905), Kansas City, Mo. Vouchers, S. Stewart and B. F. Kaupp.

E. A. Jenkins, M.D.V. (McKillip Vet. College, 1903), Shelbyville, Ill. Vouchers, G. B. Jones and F. H. Barr.

Peter T. Keeley, V.S. (New York College of Veterinary Surgeons, 1894), Waterbury, Conn. Vouchers, R. P. Lyman and Thos. Bland.

Charles Labash, D.V.S. (Kansas City Vet. College, 1907), Passaic, N. J. Vouchers, W. Herbert Lowe and J. Payne Lowe.

F. E. Lawton, V.S. (Ontario Vet. College, 1893), Greencastle, Ind. Vouchers, J. W. Klots and G. H. Roberts.

Daniel B. Leininger, D.V.S. (Kansas City Vet. College, 1906), Kansas City, Mo. Vouchers, A. T. Kinsley and B. F. Kaupp.

Willis B. Lincoln, D.V.M. (Vet. Dept., Iowa State College, 1893), Nashville, Tenn. Vouchers, G. R. White and Jos. Plaskett.

O. E. Lindberg, M.D.V. (McKillip Vet. College, 1906), Washington, D. C. Vouchers, A. M. Farrington and J. P. Turner.

Geo. H. Locke, D.V.S. (Vet. Dept., U. Cal., 1898), Lockeford, Cal. Vouchers, Carl W. Fisher and Wm. F. Egan.

Stephen Lockett, V.M.D. (Vet. Dept. U. of P., 1906), Philadelphia, Pa. Vouchers, C. J. Marshall and J. C. McNeil.

W. H. Luther, M.D.C. (Chicago Vet. College, 1902), Booneville, Ind. Vouchers, A. W. Bitting and R. A. Craig.

Winfred B. Mack, D.V.M. (N. Y. State Vet. College, 1904), Reno, Nev. Vouchers, James Law and R. P. Lyman.

Daniel J. Mangan, D.V.S. (New York-American Vet. College, 1900), New York City, N. Y. Vouchers, R. R. Bell and W. R. Blair.

H. Marshall, D.V.S. (Ohio Vet. College, 1893), Charlottesville, Va. Vouchers, John Spencer and R. R. Clark.

H. W. McConnell, D.V.S. (Kansas City Vet. College, 1904), Kansas City, Mo. Vouchers, S. Stewart and B. F. Kaupp.

Geo. H. Miner, D.V.M. (New York State Vet. College, 1903), Washington, D. C. Vouchers, A. D. Melvin and A. M. Farrington.

David G. Moberly, D.V.S. (Kansas City Vet. College, 1900), Manila, P. I. Vouchers, G. E. Nesom and A. S. Shealy.

Harry T. Moss, D.V.M. (Cincinnati Vet. College, 1905), Germantown, Ohio. Vouchers, E. H. Shepard and J. V. Newton.

H. H. Newcomb, D.V.S. (McGill University, 1897), Bridgeport, Conn. Vouchers, R. P. Lyman and Chas. L. Colton.

W. Oscar Ney, D.V.S. (Kansas City Vet. College, 1907), Thayer, Mo. Vouchers, A. T. Kinsley and B. F. Kaupp.

Jasper S. Potter, D.V.S. (Chicago Vet. College, 1892), Iowa City, Iowa. Vouchers, W. A. Heck and J. H. McNeil.

Marcus J. Ragland, D.V.M. (Cincinnati Vet. College, 1905), Monroe, N. C. Vouchers, G. A. Roberts and Tait Butler.

Chester L. Roadhouse, D.V.M. (New York State Vet. College, 1906), Berkeley, Cal. Vouchers, Carl W. Fisher and A. R. Ward.

J. W. Robinson, M.D.V. (Harvard Vet. College, 1898), Natick, Mass. Vouchers, Austin Peters and Chas. H. Perry.

Walter E. Sharp, V.M.D. (Vet. Dept. U. of P., 1904), Newton, Iowa. Vouchers, G. A. Johnson and J. H. McNeil.

Wm. P. Sheppard, M.R.C.V.S. (Royal College of Vet. Surgeons, England, 1870), Sheepshead Bay, Brooklyn, N. Y. Vouchers, J. E. Ryder and R. R. Bell.

J. Harvey Slater, D.V.S. (Kansas City Vet. College, 1903), Richmond, Mo. Vouchers, S. Stewart and F. F. Brown.

Clarence E. Smith, D.V.S. (Kansas City Vet. College, 1907), Newbern, N. C. Vouchers, Tait Butler and G. A. Roberts.

Henry S. Smith, V.S. (Ontario Vet. College, 1889), Albion, Mich. Vouchers, S. Brenton and G. W. Dunphy.

Robert P. Smith, D.V.S. (Kansas City Vet. College, 1907), Edison, Neb. Vouchers, Chas. A. McKim and A. T. Peters.

Rosslyn J. Stafford, D.V.M. (New York State Vet. College, 1906), Washington, D. C. Vouchers, A. D. Melvin and J. R. Mohler.

E. F. Stewart, M.D.C. (Chicago Vet. College, 1905), Beatrice, Neb. Vouchers, Chas. A. McKim and A. T. Peters.

William J. Stewart, D.V.S., M.D. (National Vet. College, 1894), Tullahoma, Tenn. Vouchers, G. R. White and J. Plaskett.

James M. Tade, Sr., D.V.S. (Kansas City Vet. College, 1903), Vincennes, Ind. Vouchers, A. W. Bitting and R. A. Craig.

A. C. Tillman, M.D.V. (McKillip, 1902), Earlville, Ill. Vouchers, L. A. Merillat and Jos. Hughes.

Wallace F. Vail, D.V.S. (New York-American, 1905), Greenwich, Conn. Vouchers, R. P. Lyman and Thomas Bland.

Henry J. Washburn, D.V.S. (Columbian University, 1898), Washington, D. C. Vouchers, A. D. Melvin and J. R. Mohler.

John H. Webster, D.V.S. (Kansas City Vet. College, 1906), San Francisco, Cal. Vouchers, Carl W. Fisher and C. M. Haring.

Morris Wooden, Ph.B., D.V.S. (National Vet. College, 1895), Washington, D. C. Vouchers, A. D. Melvin and R. P. Steddom.

F. H. Wright, D.V.M. (New York State Vet. College, 1906), Brooklyn, N. Y. Vouchers, E. B. Ackerman and R. R. Bell.

Geo. D. Young, D.V.S. (Kansas City Vet. College, 1906), Washington, D. C. Vouchers, A. D. Melvin and A. M. Farrington.

E. H. Yunker, V.M.D. (Vet. Dept. U. of P., 1906), Philadelphia, Pa. Vouchers, F. H. Schneider and C. J. Marshall.

On motion duly seconded and passed, it was voted to recommend to the Association that the following persons be reinstated to active membership:

Harry E. Bates, D.V.S. (American Vet. College, 1889), South Norwalk, Conn. Vouchers, R. P. Lyman and E. C. Ross.

H. D. Clark, D.V.S. (McGill Univ., 1895), Fitchburg, Mass. Vouchers, James Law and R. P. Lyman.

Frank P. Dorian, D.V.S. (American Vet. College, 1893), Yonkers, N. Y. Vouchers, W. H. Kelly and James Law.

R. A. Ramsay, D.V.S. (McGill Univ., 1892), Washington, D. C. Vouchers, R. P. Steddom and A. D. Melvin.

E. C. Schroeder, M.D.V. (Harvard Univ., 1887), Bethesda, Md. Vouchers, A. D. Melvin and J. R. Mohler.

J. C. Whitney, V.S. (Ontario Vet. College, 1882), Hillsdale, Mich. Vouchers, G. W. Dunphy and S. Brenton.

On motion the Committee adjourned to 2 P.M.

RICHARD P. LYMAN,
Secretary.

President Law: Gentlemen, you have heard the report of the Executive Committee, what will you do with it?

Dr. Wm. Herbert Lowe: Mr. President, I move you, sir, that the report be received and that the several recommendations be taken up seriatim. Seconded. (Carried.)

It was moved, seconded and carried to adopt the recommendation to suspend the By-Law during this meeting relating to receiving application for membership.

Dr. Hoskins: I move that the By-Laws be suspended and that the Secretary be instructed to cast the ballot of the Association for the election to membership in this Association of the gentlemen whose applications have been read and that they be declared elected to membership. Seconded. (Carried.)

Secretary Lyman: I now cast the ballot according to your instructions for election to active membership in this Association of the gentlemen whose names I have just read.

President Law: I declare them elected.

Dr. Hoskins: I move that the secretary be instructed to cast the ballot of the Association for the reinstatement to active membership of those gentlemen whose names he has just read. Seconded. (Carried.)

Secretary Lyman: I cast the ballot of the Association according to your instructions for the reinstatement to active membership of those gentlemen whose names I have just read.

President Law: I declare them reinstated to membership. The Secretary has another report to which you will please give your attention.

The Secretary reads as follows:

REPORT OF THE EXECUTIVE COMMITTEE.

A special meeting of the Executive Committee was held in the parlors of the Coates House, Kansas City, Mo., Sept. 9, 1907, at 2 P.M., Dr. W. H. Dalrymple, presiding.

Members Present: Doctors W. H. Dalrymple, R. R. Bell, Jensen, Lyman, Williams, G. R. White, Law and Merillat.

Members Absent: Doctors Reynolds, D. S. White, Rutherford Monsarrat and Ackerman.

On motion duly made, seconded, and passed, the President and Secretary were authorized to sign the following applications, and that said applicants be then recommended for election to membership in the Association.

H. A. **Alcorn**, M.D.C. (Chicago Vet. College, 1904), Adair, Iowa. Vouchers, G. A. Johnson, James Law, and R. P. Lyman.

S. W. **Allen**, M.D.C. (Chicago, Vet. College, 1907), Watertown, S. Dak. Vouchers, Jos. Hughes, A. H. Baker, James Law and R. P. Lyman.

Elbert M. **Bates**, D.V.S. (Kansas City Vet. College, 1907), Coffeyville, Kan. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

Wm. S. **Bell**, V.S. (Ontario Vet. College, 1882), Cranbrook, B. C. Vouchers, S. F. Tolmie, James Law and R. P. Lyman.

J. E. **Blackwell**, V.S. (Ontario Vet. College, 1887), Hutchinson, Kan. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

John William Bland, V.S. (Ontario Vet. College, 1888), Vancouver City, B. C. Vouchers, S. F. Tolmie, James Law and R. P. Lyman.

Edward A. **Bundy**, D.V.S. (Kansas City Vet. College, 1905), Reno, Nev. Vouchers, J. Otis Jacobs, James Law and R. P. Lyman.

Elvon S. **Dickey**, D.V.S. (Kansas City Vet. College, 1906), Sioux City, Iowa. Vouchers, G. A. Johnson, James Law and R. P. Lyman.

George A. **Dodge**, V.M.D. (Vet. Dept. of University of Penn., 1904), Northwood, Iowa. Vouchers, C. A. Johnson, James Law and R. P. Lyman.

WILTON ELERY, D.V.S. (Kansas City Vet. College, 1906), Anita, Iowa. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

GUY C. FURNISH, D.V.S. (Kansas City Vet. College, 1904), Hiawatha, Kan. Vouchers, S. Stewart, B. F. Kaupp, James Law and R. P. Lyman.

H. J. FREDERICK, D.V.M. (Iowa State College, 1905), Logan, Utah. Vouchers, Chas. G. Lamb, James Law and R. P. Lyman.

W. H. GADDES, V.S. (Ontario Vet. College, 1892), Kelowna, B. C., Canada. Vouchers, S. F. Tolmie, James Law and R. P. Lyman.

H. H. S. GEORGE, M.R.C.V.S. (Royal College of Vet. Surgeons, London, Eng., 1901), Kamloops, B. C. Vouchers, S. F. Tolmie, James Law and R. P. Lyman.

W. M. GORDON, D.V.M. (Iowa State College, 1905), Sioux City, Iowa. Vouchers, G. A. Johnson, James Law and R. P. Lyman.

WILLIAM JOHN HARTMAN, B.S.A., M.D.C. (Chicago Vet. College, 1904), Bozeman, Mont. Vouchers, Joseph Hughes, A. H. Baker, James Law and R. P. Lyman.

LOGAN B. HUFF, D.V.S. (Kansas City Vet. College, 1904), Spokane, Wash. Vouchers, S. Stewart, F. F. Brown, James Law and R. P. Lyman.

FRANK HUNT, V.S. (Ontario Vet. College, 1887), Jamestown, N. Y. Vouchers, William Henry Kelly and James Law.

JESSE W. JOSS, D.V.S. (Kansas City Vet. College, 1906), Hutchinson, Kan. Vouchers, A. T. Kinsley, S. Stewart, James Law and R. P. Lyman.

EDWARD D. KENNEDY, D.V.S. (Kansas City Vet. College, 1906), Seattle, Wash. Vouchers, A. T. Kinsley, B. F. Kaupp, James Law and R. P. Lyman.

A. D. KNOWLES, D.V.S. (Kansas City Vet. College, 1906), Livingston, Mont. Vouchers, M. E. Knowles, James Law and R. P. Lyman.

J. V. LACROIX, D.V.S. (Kansas City Vet. College, 1906), Hiawatha, Kan. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

WALTER J. LACY, D.V.S. (Kansas City Vet. College, 1906), Parsons, Kan. Vouchers, S. Stewart, B. F. Kaupp, James Law and R. P. Lyman.

CARLOS ORTES DE LANDOZURIS RODAS (Official Vet. College, Madrid, Spain, 1871), Ponce, Porto Rico. Vouchers, Thomas A. Allen, James Law and R. P. Lyman.

J. F. MACK, M.D.V. (McKillip College, 1906), River Falls, Wis. Vouchers, Chas. E. Cotton, S. H. Ward, James Law and R. P. Lyman.

B. W. MURPHY, M.D.C. (Chicago Vet. College, 1899), St. Joseph, Mo. Vouchers, Joseph Hughes, A. H. Baker, James Law and R. P. Lyman.

C. L. NORRIS, D.V.S. (Kansas City Vet. College, 1907), North Bend, Neb. Vouchers, S. Stewart, B. F. Kaupp, James Law and R. P. Lyman.

W. R. O'NEAL, D.V.S. (Kansas City Vet. College, 1904), Wayne, Neb. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

FRED. W. PORTER, D.V.M. (Ohio State Vet. College, 1904), Tampa, Fla. Vouchers, J. G. Hill, James Law and R. P. Lyman.

FREDERICK L. SCHNEIDER, B.S., D.V.S. (Kansas City Vet. College. 1905), Albuquerque, New Mexico. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

HERBERT SILVERWOOD, M.D.C. (Chicago Vet. College, 1907), Pendleton, Ore. Vouchers, Joseph Hughes, James Law and R. P. Lyman.

N. C. **Spalding, Jr.**, D.V.S. (Kansas City Vet. College, 1907), Provo City, Utah. Vouchers, S. Stewart, F. F. Brown, James Law and R. P. Lyman.

J. G. **Steele**, D.V.S. (Kansas City Vet. College, 1906), Oklahoma, Okla. Vouchers, S. Stewart; B. F. Kaupp, James Law and R. P. Lyman.

D. S. **Tamblyn**, D.V.S. (McGill University, 1901), Midway, B. C. Vouchers, S. F. Tolmie, James Law and R. P. Lyman.

R. A. **Tucker**, D.V.S. (Kansas City Vet. College, 1907), Lincoln, Neb. Vouchers, S. Stewart, R. C. Moore, James Law and R. P. Lyman.

A. W. **Whitehouse**, V.S. (Ontario Vet. College, 1894), Laramie, Wyo. Vouchers, James Law and R. P. Lyman.

Upon motion, duly seconded and passed, it was voted to recommend that where members of the Association are found using illuminated stationery in a manner to violate the code of ethics the matter be referred to the Resident State Secretary for attention.

Voted that we recommend that the names of Dr. L. H. Howard and Dr. R. H. Harrison be placed upon the honor roll of the Association.

Voted that we recommend that the resignation of Dr. D. W. Curtis be accepted.

Voted that we recommend that Mr. I. I. Schmidt, of Kolding, Denmark, in consideration of his valuable contributions to veterinary science in relation to the treatment of parturient paresis, be elected to honorary membership in this Association.

On motion the Committee adjourned to 8 A.M., Sept. 19, '07.

RICHARD P. LYMAN,
Secretary.

Dr. Hoskins: Mr. President I move that the report be received and the recommendations taken up seriatim.

Dr. S. Stewart: Mr. President, I move that the rules be suspended and the Secretary be instructed to cast the vote of the Association for the election to active membership of the candidates whose names have just been read. Seconded. (Carried.)

Secretary Lyman: In accordance with your wish, I cast the vote of the Association for the election to active membership the gentlemen whose names I have just read.

President Law: I declare them elected. The next is to take up the remaining recommendations of the Committee.

Dr. Hoskins: I move the approval of the recommendation relating to the use of illuminated stationery. Seconded. (Carried.)

Dr. Wm. Herbert Lowe: I move that we accept the recommendation placing Drs. R. H. Harrison and L. H. Howard upon the Honor Roll. Seconded. (Carried.)

Dr. Tait Butler: I move the adoption of the recommendation accepting the resignation of Dr. D. W. Curtis. Seconded. (Carried.)

Secretary Lyman reads: "Voted that we recommend that Mr. I. I. Schmidt, Kolding, Denmark, in consideration of his valuable contributions to veterinary science in relation to the successful treatment of parturient paresis, be elected to honorary membership in this Association."

Dr. Hoskins: I move to approve the recommendation. Seconded. (Carried.)

Secretary Lyman: I move that we approve the two reports of the Executive Committee as a whole. Seconded. (Carried.)

Secretary Lyman: Mr. President, I have just received a cablegram:

"Paris, Sept. 10, 1907.

"Dr. Lyman,
"American Veterinary Medical Association,
"Coates House, Kansas City.

"Friendly souvenirs and warmest wishes for success of greatest Veterinary Association in the world. Liautard." (Applause.)

Dr. Hoskins: Mr. Chairman, I move that this Association send a return cablegram to Dr. Liautard with our greetings. Seconded. (Carried.)

President Law: The next is the report of the Committee on Intelligence and Education, Dr. Leonard Pearson, Chairman.

In the absence of Dr. Pearson the report was read by Dr. Hoskins.

Dr. Hoskins: I move that Dr. Pearson's paper with the others contributing to the report, be referred to the Association of Faculties. Seconded. (Carried.)

See Reports of Officers and Committees.

President Law: The next subject is the report of the Committee on Diseases, Dr. V. A. Moore, Chairman.

Dr. Hoskins: Mr. Chairman, before listening to the report of Dr. Moore, I move that the report of the Committee on Intelligence and Education be received.

Secretary Lyman: I would like to make an amendment to that, Mr. Chairman, and move that it be referred to the Committee on Publication.

Dr. Hoskins: I will accept the amendment. Seconded. (Carried.)

Dr. Moore: Mr. President, I wish to say in this connection that Dr. Higgins, another member of this committee, proposed to give something in addition to this report. Dr. Higgins was unable to be present, and wrote me that he wished this paper to be withdrawn, as in order to present it properly it would be necessary to demonstrate it with fresh preparations in order to show these organisms, and that it could not well be done.

Dr. Moore then read his portion of the report of the Committee on Diseases. See Reports of Officers and Committees.

President Law: Dr. Merillat will read his contribution to the report entitled: "The Disposal of Horses Affected with Occult Glanders." See Reports of Officers and Committees.

Secretary Lyman: I move that the report of the Committee on Diseases be received and referred to the Publication Committee. Seconded. (Carried.)

President Law: The next order of business is the report of the Committee on Publication, Dr. C. J. Marshall, Chairman. See Reports of Officers and Committees.

Dr. Hoskins: I move that the report be received and be referred to the Publication Committee. Seconded. (Carried.)

President Law: The next is the report of the Committee on Army Legislation.

Secretary Lyman: I have the report of the Committee on Army Legislation, and as the report is the same, I think, as was published in the last American Veterinary Review, I hardly think it is necessary to read it unless it is the desire of the meeting.

Dr. Hoskins: I move that it be received and be referred to the Publication Committee. Seconded. (Carried.)

See Reports of Officers and Committees.

President Law: The next is the report of the Secretary.

See Reports of Officers and Committees.

Dr. William Herbert Lowe: Mr. Chairman, I move that this report be accepted, published in the annual proceedings, and, further that it be referred to the present Executive Committee for the consideration of the recommendations contained therein. Seconded. (Carried.)

President Law: The next order of business is the report of the Treasurer, Dr. G. R. White.

Dr. William Herbert Lowe: Mr. Chairman, I take much pleasure in moving, sir, that this report be received and referred to the Finance Committee. Seconded. (Carried.)

See Reports of Officers and Committees.

Secretary Lyman: Mr. President, I move you, as it is now half past five, that we drop the regular program and proceed to the election of officers. Seconded. (Carried.)

President Law: The Report of the Nominating Committee is called for.

Dr. William Herbert Lowe: Mr. President and Gentlemen: Your Committee on Nominations, consisting of ex-Presidents Robertson, Williams, Hoskins, Butler, Winchester, Stewart, Bell, and Lowe, beg to submit the following nominees for the various offices:

For President: W. H. Dalrymple of Louisiana, Joseph Hughes of Illinois, M. H. Reynolds of Minnesota.

The nominees for Vice-President are as follows: R. A. Archibald, California; Thomas Bland, Connecticut; C. A. Cary, Alabama; A. S. Cooley, Ohio; Charles G. Lamb, Colorado; J. H. McNeil, Iowa; A. D. Melvin, District of Columbia; R. C. Moore, Missouri; Otto G. Noack, Pennsylvania; D. A. Piatt, Kentucky; George H. Roberts, Indiana; Thomas E. Smith, New Jersey.

For Secretary: H. Jensen, Nebraska; R. P. Lyman, Connecticut.

For Treasurer: C. J. Marshall, Pennsylvania; G. R. White, Tennessee.

Dr. Hughes withdrew his nomination for President in favor of Dr. Dalrymple. Drs. Jensen and Marshall withdrew their nominations for Secretary and Treasurer.

President Law: You have heard the expressions of self-denial by Dr. Hughes. Please prepare your ballots for President. I will appoint Drs. T. E. Smith and Ackerman as tellers to distribute and collect the ballots.

Secretary Lyman: While you are waiting for the result of the ballot, I will announce another cablegram from Dr Monserrat: "Honolulu. Greetings."

Dr. Hoskins: While the officers are counting the votes, I want to ask this Association to come to Philadelphia in 1908. The Pennsylvania State Society will then be twenty-five years in active existence and we wish you would come and enjoy our program with us.

The following members were elected officers for the ensuing year:

President, W. H. Dalrymple.

Vice-Presidents, A. D. Melvin, R. C. Moore, J. H. McNeil, R. A. Archibald, C. A. Cary.

Secretary, R. P. Lyman.

Treasurer, G. R. White.

Dr. Reynolds: I move that the election of Dr. W. H. Dalrymple for President be made unanimous. Seconded. (Carried.)

On motion the convention adjourned to Wednesday, September 11, 1907, at 10 A. M.

Wednesday Morning,
September 11, 1907.

The Convention was called to order at 10.15 A. M. President Law in the chair.

President Law: I call for the reports of the Resident Secretaries. I will call the different states and the Secretaries present will please respond.

Dr. D. A. Hughes: Mr. Chairman, I make a motion that the reports of the Resident Secretaries be handed to the Secretary to be included in the annual report without reading. Seconded. (Carried.) See Reports of Officers and Committees.

President Law: The next order of business is the report of the Executive Committee.

Secretary Lyman then read a report of a special meeting of the Executive Committee as follows:

REPORT OF THE EXECUTIVE COMMITTEE.

A special meeting of the Executive Committee was held in the parlors of the Coates House, Kansas City, Mo., Tuesday, September 10th, at 8.30 A.M., Dr. W. H. Dalrymple presiding.

Members Present: Doctors Dalrymple, Law, Lyman, Brenton, Jensen, Reynolds, Merillat, G. R. White, R. R. Bell and Williams, and by appointment, Tait Butler and G. W. Loveland.

Members Absent: Doctors Rutherford, D. S. White, Monsarrat, and Ackerman.

On motion, duly seconded and passed, it was voted that the following persons be recommended to the Association for election to active membership:

M. J. Dunleavy, M.D.C. (Chicago Vet. College, 1897), Denver, Col. Vouchers, Chas. G. Lamb, L. A. Merillat, James Law and R. P. Lyman.

Chas. R. McCoppin, D.V.S. (Kansas City Vet. College, 1906), Wilcox, Neb. Vouchers, H. Jensen and A. T. Peters.

W. C. McPherson, D.V.S. (Kansas City Vet. College, 1904), New York City. Vouchers, S. Stewart, B. F. Kaupp, James Law and R. P. Lyman.

Thomas Jefferson Mahaffy, V.M.D. (University of Penn., 1905), Jacksonville, Fla. Vouchers, W. Horace Hoskins, C. J. Marshall, James Law and R. P. Lyman.

John A. Meagher, D.V.S., D.V.M. (Ohio Vet. College, 1895, and Cincinnati Vet. College, 1905), Glendale, Ohio. Vouchers, E. H. Shepard and D. S. White.

P. Juckniess, D.V.S. (Kansas City Vet. College, 1906), Omaha, Neb. Vouchers, H. Jensen and A. T. Peters.

J. Ellis Jennings, D.V.S. (Kansas City Vet. College, 1907), Shelton, Neb. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

Frank Jelen, D.V.S. (Kansas City Vet. College, 1905), Omaha, Neb. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

L. B. Philpott, D.V.S. (Kansas City Vet. College, 1907), Manti, Utah. Vouchers, S. Stewart, F. F. Brown, James Law and R. P. Lyman.

Lee B. Songer, D.V.S. (Kansas City Vet. College, 1903), Grand Island, Neb. Vouchers, A. T. Kinsley, B. F. Kaupp, James Law and R. P. Lyman.

S. H. Stephens, D.V.M. (Cincinnati Vet. College, 1904), Loveland, Ohio. Vouchers, E. H. Sheppard and D. S. White.

W. B. Welch, D.V.M. (Vet. Dept. of Iowa A. C., 1883), Marshall, Mo. Vouchers, S. Stewart and F. F. Brown.

M. J. Woodliffe, M.D.C. (Chicago Vet. College, 1903), Denver, Col. Vouchers, Chas. G. Lamb, L. A. Merillat, James Law and R. P. Lyman.

John Scott, V.S. (Ontario Vet. College, 1886), Peoria, Ill. Vouchers, L. A. Merillat, W. L. Williams, James Law and R. P. Lyman.

On motion, duly seconded and passed, it was voted to recommend to the Association that the bills, amounting to $12.55, due Dr. William Herbert Lowe for expenses while Treasurer and President of the Association, be paid.

On motion, duly passed, it was voted to recommend to the Association that the resignation of Dr. H. B. Adair, of Missouri, be accepted.

Voted, that we recommend to the Association, that all members in arrears for dues for a period of eighteen months, at the time of publication of the annual report, be suspended from membership.

On motion, the Committee adjourned, to meet at 7.30 P.M., September 10th.

RICHARD P. LYMAN,
Secretary.

PRESIDENT LAW: Gentlemen, you have heard the report of the Executive Committee, what is your pleasure?

DR. WM. HERBERT LOWE: I move you, sir, that we receive the report of the Committee and take up the recommendations seriatim. Seconded. (Carried.)

DR. HOSKINS: I move a suspension of the By-Laws and that the Secretary cast the vote of the Association for the election to active membership the gentlemen whose names have just been read by him. Seconded. (Carried.)

PRESIDENT LAW: I declare them duly elected.

The other recommendations were read seriatim and adopted.

DR. HOSKINS: I move that the report of the Executive Committee submitted this morning be accepted as a whole. Seconded. (Carried.)

At this point Secretary Lyman read letters of regret from Dr. D. E. Salmon, Montevideo, Uruguay, South America, and Dr. J. G. Rutherford, Ottawa, Canada.

PRESIDENT LAW: We shall proceed with the papers. The first paper is entitled "John Smith and His Misfortunes," A. Liautard, Paris, France.

SECRETARY LYMAN: Mr. President, I have Dr. Liautard's paper. What will be the sense of the meeting as to having it read, or shall it be referred to the Publication Committee for publication in the annual proceedings?

DR. D. A. HUGHES: I move that the Secretary be instructed to read Dr. Liautard's paper. Seconded. (Carried.) See Papers and Discussions.

PRESIDENT LAW: The next paper is by Dr. D. Arthur Hughes, Chicago, Ill., entitled "The Place of Veterinary Medicine in State Education." See Papers and Discussions.

PRESIDENT LAW: The next paper "Observations on the Veterinary Education and Practice in Europe," by Dr. P. A. Fish, Ithaca, N. Y. I would suggest that it might be well to postpone the discussion of Dr. Hughes' paper until Dr. Fish has read his paper; they are both on relative subjects which can be well taken together. See Papers and Discussions.

DR. HOSKINS: I move that the discussion of these two papers be deferred until after luncheon. Seconded. (Carried.)

PRESIDENT LAW: The convention stands adjourned until 2 P. M.

WEDNESDAY AFTERNOON,
September 11, 1907.

Convention called to order by President Law at 2 P. M.

PRESIDENT LAW: The discussion on the papers submitted by Drs. Hughes and Fish is now in order. See Papers and Disscussions.

PRESIDENT LAW: I will now call for the report of the Finance Committee. See Reports of Committee and Officers.

DR. HOSKINS: I move that the report of the Finance Committee be received and referred to the Committee on Publication. Seconded. (Carried.)

SECRETARY LYMAN: I have a little matter I want to speak of at this time. During the balloting for officers yesterday you elected one of the Vice-Presidents a little in advance of action on his application for reinstatement. Dr. R. A. Archibald, Chicago Veterinary College, 1891, vouched for by Drs. Jensen, Hughes (J.), Baker (G. H.), Merillat, Dalrymple, Reynolds, White (G. R.), and Lyman, all members of the Executive Committee, has made this application out, and it will be necessary to act upon this and then, I think, we can correct the action of yesterday by a proper motion in order that Dr. Archibald may be properly elected to represent the western part of this country as a Vice-President of this Association.

PRESIDENT LAW: This application for reinstatement of Dr. Archibald is now before you; what action will you take?

DR. HOSKINS: Mr. President, I move the application be received and to suspend the rules, and that, further, the Secretary be directed to cast the ballot of this Association for the reinstatement of Dr. Archibald as a member of the Association. Seconded. (Carried.)

SECRETARY LYMAN: In accordance with the wish of this Association, I cast the ballot for the reinstatement of Dr. Archibald.

DR. HOSKINS: I move that this Association confirm the election of Dr. Archibald as Vice-President of this society taken yesterday. Seconded. (Carried.)

SECRETARY LYMAN: Mr. President, I have here a report of the Executive Committee which I will read with your permission.

REPORT OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held in the parlors of the Coates House, Tuesday evening, September 10th, at 7.30 P.M., Dr. W. H. Dalrymple presiding.

MEMBERS PRESENT: Doctors Dalrymple, Jensen, Merillat, Lyman, G. R. White, Reynolds, Brenton, R. R. Bell, Ackerman and Law.

MEMBERS ABSENT: Doctors Rutherford, D. S. White, and Monsarrat.

Voted, that the bill of Dr. Otto G. Noack for $2 for expenses be recommended to the Association for payment.

Voted, that we recommend to the Association, that Dr. William

L. West be permitted to withdraw his application for membership, and that the Secretary be instructed to return his application fee.

Voted, that we recommended that Section 1, Article V, of the Constitution and By-laws be amended by inserting the words "Committee on Legislation" between lines six and seven of said section.

Voted, that we recommended that Article V be amended by inserting between Sections 3 and 4 of said article a new section to read as follows: Section 4, "It shall be the duty of the Committee on Legislation to use its best efforts to secure the enactment or the defeat of such legislation as the Association directs, and as ordered by the President."

Voted, that the Committee on Publication be given power to renumber the sections of Article V so that the proper numerical order shall be maintained.

Voted, that we recommend that Section 2 of Article VI be amended by changing the last clause to read as follows: "These provisions shall include the graduates of former two-year schools that have maintained the three-year course for the last five years."

Voted, that we recommend that the applications of the following persons be rejected, and that the Secretary be instructed to return their application fees:

R. B. Blume, William F. Davis, J. G. Fennyhough, Henry F. Hungerford, T. H. McKeown, C. Barnwell Robinson, and M. Page Smith.

Voted, that we recommend to the Association that the following candidates be elected to membership:

O. L. Boor, V.S. (Ontario Vet. College, 1890), Muncie, Ind. Vouchers, G. H. Roberts and J. W. Klotz.

E. M. Bronson, M.D.C., V.S. (Chicago Vet. College, 1900, and Indiana Vet. College, 1901), Indianapolis, Ind. Vouchers, G. H. Roberts and J. W. Klotz.

Benjamin F. Davis, D.V.S. (Kansas City Vet. College, 1907), Fort Scott, Kan. Vouchers, B. F. Kaupp, S. Stewart, James Law and R. P. Lyman.

Edwin O. Odell, M.D.C. (Chicago Vet. College, 1907), Centre City, Neb. Vouchers, J. S. Anderson and H. Jensen,

R. F. Eagle, D.V.S. (Kansas City Vet. College, 1901), Kansas City, Kan. Vouchers, C. J. Sihler, S. Stewart, James Law and R. P. Lyman.

Henry C. Gardner, B.S.A., M.D.C. (Chicago Vet. College, 1904), Bozeman, Mont. Vouchers, V. A. Moore and L. Pearson.

J. F. Hemphill, D.V.S. (Kansas City Vet. College, 1907), Clay

Center, Kan. Vouchers, A. T. Kinsley, B. F. Kaupp, James Law and R. P. Lyman.

W. J. HART, D.V.S. (Kansas City Vet. College, 1907), Wetmore, Kan. Vouchers, S. Stewart, A. T. Kinsley, James Law and R. P. Lyman.

JAMES G. HOPE, M.D.C., D.V.S. (Chicago Vet. College, 1896, and American College, New York, 1897), Fort Madison, Ia. Vouchers, G. A. Johnson, James Law and R. P. Lyman.

OSCAR SILFVER, M.D.C. (Chicago Vet. College, 1896), Peoria, Ill. Vouchers, I. K. Atherton and A. H. Baker.

HARRY C. MCCARTNEY, M.D.C. (Chicago Vet. College, 1906), Norwich, Conn. Vouchers, R. P. Lyman and Thomas Bland.

ROBERT A. MCCARTNEY, M.D.C. (Chicago Vet. College, 1906), Norwich, Conn. Vouchers, R. P. Lyman and Thomas Bland.

I. E. NEWSOM, D.V.S. (San Francisco Vet. College, 1906), Denver, Col. Vouchers, Chas. G. Lamb and Mark White.

BURTON R. ROGERS, D.V.M. (Iowa State College, 1899), Manhattan, Kan. Vouchers, M. H. Reynolds, L. R. Baker, J. H. McNeil, James Law and R. P. Lyman.

HERMAN R. RYDER, D.V.M. (New York State Vet. College, 1897), Chicago, Ill. Vouchers, James Law, E. L. Quitman, E. B. Ackerman and R. P. Lyman.

CHAS. C. SCHLOMER, V.M.D. (University of Penn., 1907), New York City, N. Y. Vouchers, Roscoe R. Bell and J. L. Robertson.

W. A. SCOTT, V.S., M.D.C. (Chicago Vet. College, 1905), Columbus, Ga. Vouchers, W. H. Dalrymple, G. R. White, James Law and R. P. Lyman.

C. S. SHORE, V.M.D. (University of Penn., 1901), Lake City, Minn. Vouchers, M. H. Reynolds and Chas. E. Cotton.

C. H. STANGE, D.V.M. (Iowa State College, 1907), Ames, Ia. Vouchers, P. Malcolm and J. H. McNeil.

Voted that we recommend that the following applications be laid over for another year: JOHN WM. JOHNSTON, V.S.; W. T. PUGH, V.S.; CHAS. E. STEELE, D.V.S.

Voted, that we recommend to the Association the adoption of the following recommendations made by the Committee on Intelligence and Education:

1st. That graduates of the following schools shall be considered eligible to membership in the American Veterinary Medical Association: New York State Veterinary College, University of Pennsylvania (Vet. Dept.), New York-American Veterinary College, Laval University (Veterinary Dept.), Chicago Veterinary College, McKillip Veterinary College, San Francisco Veterinary College, Kansas City Veterinary College, Ohio State University (Veterinary Dept.), Washington State College (Veterinary Dept.), Iowa State College (Veterinary Dept.), Cincinnati Veterinary College, Harvard University (Veterinary Dept.), Indiana State College, McGill University, and Columbian University.

2d. That the Committee on Intelligence and Education continue to acquaint the Association with the status of the schools and examining boards at each annual meeting.

3d. That the American Veterinary Medical Association cooperate with the Association of Faculties and Examining Boards and endeavor by all honorable means to raise or improve the standard of veterinary education in the United States and Canada.

4th. That the Association encourage uniform entrance requirements, uniform curricula, uniform examinations, uniform graduation requirements and uniform degrees.

Voted, that we recommend to the Association that the following recommendations of the Committee on Intelligence and Education be disapproved:

1st. That whenever in the opinion of the Association its finances will permit without embarrassment, the President shall appoint one or more members to visit and investigate the methods in vogue at the various schools, and report his or their findings to the Association—all to be done at the expense of this Association.

2d. That the moral support and encouragement of the Association be given to all worthy veterinary educational institutions.

3d. That the night course as given at McKillip Veterinary College be commended, as it enables many young men of limited financial means to secure a professional education.

4th. That three-year graduates of the Grand Rapids Veterinary College be considered eligible to membership in the American Veterinary Medical Association, provided this school lives up to its published announcement for the year 1906–1907, the declaration of principles herein contained, in a letter signed by its Dean, to be considered part of the announcement.

5th. That it is advisable for State Examining Boards to be associated with the Department of Education in the different states, provinces and territories. Or that suitable state officers outside of our profession be added to the boards as *ex-officio* members.

Richard P. Lyman,
Secretary.

Dr. Wm. Herbert Lowe: Mr. President, I move that we receive the report of the Executive Committee and take up the recommendations separately. Seconded. (Carried.)

Dr. Hoskins: I move to approve the recommendation that the bill of Dr. Noack be paid. Seconded. (Carried.)

Dr. Hoskins: I move that we permit Dr. W. L. West to withdraw his application for membership, and that the Secretary be instructed to return his application fees. Seconded. (Carried.)

Dr. Wm. Herbert Lowe: I move that the Association adopt the recommendation amending Section 1 of Article V of the By-Laws. Seconded. (Carried.)

Secretary Lyman reads: Voted, that we recommend that Article V of the By-Laws be amended by inserting between Sections 3 and 4 of said article a new section to read as follows: "It shall be the duty of the Committee on Legislation to use its best efforts to secure the enactment or defeat of such legislation as the Association directs, and as ordered by the President."

Dr. G. R. White: Mr. President, I move the adoption of this recommendation. Seconded.

Dr. Piatt: Mr. President, I object to the last clause, "ordered by the President." He is already a member of the Committee, therefore, I move to strike out the last clause.

Dr. White: I am willing to accept the amendment. Seconded. (Carried.)

Secretary Lyman: Then it will read, as amended, "It shall be the duty of the Committee on Legislation to use its best efforts to secure the enactment or defeat of such legislation as the Association directs."

Dr. Wm. Herbert Lowe: I move its adoption as amended. Seconded. (Carried.)

Dr. Wm. Herbert Lowe: I move that the Publication Committee be given power to renumber the sections of Article V. Seconded. (Carried.)

Dr. A. H. Baker: I move that we adopt the recommendation amending Section 2 of Article VI. Seconded. (Carried.)

Dr. Hoskins: I move the adoption of the recommendation that the Association reject the applications as read by the Secretary. Seconded. (Carried.)

Secretary Lyman reads: Voted that we recommend to the Association that the following candidates be elected to membership. (The Secretary then read the same list of candidates as is hereinbefore set forth in the report of the Executive Committee for Tuesday evening, September 10.)

Objections were raised in reference to the four following candidates: Drs. Robert A. McCartney, Harry C. McCartney, Henry C. Gardner and I. E. Newsom.

The names of Drs. Newsom and Gardner were referred back to the Executive Committee.

Dr. Hoskins: I move that the By-Laws be suspended and that the Secretary be instructed to cast the ballot of the Association for the election to active membership of the gentlemen whose names have just been read in the report of the Executive Committee and that have not been objected to. Seconded. (Carried.)

Secretary Lyman: According to your instructions I now cast the vote of the Association for the election to active membership of those gentlemen whose names I have just read with the exception of Drs. R. A. and H. C. McCartney, I. E. Newsom and H. C. Gardner.

President Law: I declare the gentlemen elected to membership.

Dr. Cary: I move that the names of Drs. R. A. and H. C. McCartney be laid over until the next meeting of the Association. Seconded. (Carried.)

It was regularly moved, seconded and carried to concur with the recommendations from the Executive Committee, laying over the four applications read by the Secretary.

Dr. Hoskins: I move that we accept all the colleges read as qualifying graduates for membership in this Association except the San Francisco Veterinary College. Seconded. (Carried.)

It was regularly voted to adopt the recommendations, that the Committee on Intelligence and Education continue to inform the Association with the status of schools and Examining Boards; also, that this Association co-operate with the Faculties Association to endeavor to raise the standards of veterinary education in the United States and Canada, and thirdly, to encourage uniformity in entrance requirements, curricula examinations, graduation requirements and degrees.

It was regularly voted to refer back to the Executive Committee the adverse report upon the recommendation from the Committee on Intelligence and Education which reads as follows: That whenever in the opinion of the Association' its finances will permit without embarassment the president shall appoint one or more members to visit and investigate the methods in vogue at the various schools, and report his or their findings to the Association,—all to be done at the expense of the Association.

The other recommendations made by the Committee on Intelligence and Education and which were adversely reported by the Executive Committee were considered and the Association voted to concur with the action of the Committee in rejecting them.

Dr. Hoskins: I move that we approve the report of the Executive Committee as corrected. Seconded. (Carried.)

President Law: We will now revert to the papers. The first paper is that of Dr. A. H. Baker of Chicago. "Intestinal Obstructions of the Horse." See Papers and Discussions.

President Law: If there is no discussion upon Dr. Baker's paper, I will call upon Drs. S. H. Gilliland and E. L. Cornman to present their paper entitled "The Effect of the Tuberculin Test Upon Lactation." See Papers and Discussions.

President Law: I will call for the next paper, "Reminiscences of Bovine Tuberculosis in Massachusetts." Dr. J. F. Winchester, Lawrence, Mass. See Papers and Discussions.

President Law: If there is no discussion, the next paper will be called for. "Preventive Medicine as Applied in the Army," by L. E. Willyoung (officially representing the United States Army). See Papers and Discussions.

President Law: The next paper is here though Dr. Taylor is not. I will call for the paper, if any one has it, upon "The Agglutinating and Precipitating Powers of Glandered and Non-Glandered Blood Serum in Diagnosis." See Papers and Discussions.

Dr. Cary: I move to adjourn until 8 p. m. Seconded. (Carried.)

Wednesday Evening,
September 11, 1907.

Convention called to order at 8 p. m., President Law in the chair.

President Law: The first paper of the evening is entitled "Tumors," by Dr. A. T. Kinsley. See Papers and Discussions.

President Law: In consideration of the lateness of the hour we will pass over the discussion of the paper read by Dr. Kinsley, and I will call upon Dr. Reynolds to read his paper upon "Milk as Affected by Stable Practices and Subsequent Exposures." See Papers and Discussions.

President Law: Dr. Reynolds has shown something of the dangers that lie around the milk pail. We are to have another paper on "Municipal Milk Inspection in the South," by Dr. Cary of Auburn, Alabama. Unless we hear that also the subject seems to be altogether incomplete. After the paper by Dr. Cary we will be in a better position to take up the whole matter for discussion which will be opened by assignment by Dr. Joseph Hughes of Chicago. See Papers and Discussions.

President Law: I will announce that the meeting will be called to-morrow at 2 p. m., to consider the subjects still to be dealt with. In view of the backward condition of our work, the reading of the papers will be confined, according to the By-Laws, to twenty minutes. The meeting will stand adjourned until 2 p. m. to-morrow.

Thursday Afternoon,
September 12, 1907.

Convention called to order at 2.15 p. m., President Law in the chair.

President Law: The meeting will come to order. The next paper upon our list, is one upon "Stable Ventilation from Clinical Standpoint," by Dr. G. A. Johnson of Sioux City. See Papers and Discussions.

President Law: Dr. Young has a statement to make concerning the death of Dr. Ramacciotti.

Dr. Young: Mr. President and Gentlemen, I have been selected by the Nebraska Veterinary Association to make the painful announcement of the death of one of our old members, and one of our first, Dr. H. L. Ramacciotti, who died Tuesday evening very suddenly. I assure you, gentlemen, it is very painful for me, speaking in the name of all of the members of the Nebraska Association, especially as the doctor was a most tireless and zealous worker for the promotion of the welfare of the veterinary profession, not only at large, but locally and especially in assisting to bring about the necessary legislation which we have secured in the state of Nebraska. It is with regret that I have to announce the fact of his death.

Dr. Hoskins: I move that a floral offering to the value of ten dollars be provided and put upon the bier of the late lamented Dr. H. S. Ramacciotti. Seconded. (Carried.)

President Law: Dr. Melvin, Chief of the Bureau of Animal Industry, has prepared a paper upon his future work on "The Eradication of Tuberculosis." Dr. Melvin is present. He will please come forward and read his paper. See Papers and Discussions.

President Law: Dr. Mohler will speak to us for the Division of Pathology. He has a paper upon "Tuberculosis in Swine." The two will go so well together that we will postpone any discussion upon Dr. Melvin's paper until Dr. Mohler's paper has been read.

Dr. Mohler: The paper which I shall present to you this afternoon specially refers to and may be considered as a preliminary report of the Bureau on this subject, which was inaugurated by Dr. Melvin shortly after he became Chief of the Bureau. See Papers and Discussions.

President Law: The next subject is by Dr. W. L. Williams, of Ithaca, N. Y., on "Notes on the Surgical Relief of Roaring." See Papers and Discussions.

President Law: I will call for a report of the Executive Committee.

Secretary Lyman then read the following report:

REPORT OF THE EXECUTIVE COMMITTEE.

A special meeting of the Executive Committee was held in the parlors of the Coates House at 6.15 p.m., Wednesday, September 11, 1907, Dr. W. H. Dalrymple presiding.

Members Present: Doctors Law, Dalrymple, Williams, Lyman, White (G. R.), Merillat, Bell (R. R.), and Ackerman.

Members Absent: Doctors Rutherford, Brenton, White (D. S.), Monsarrat and Jensen.

On motion, duly seconded and passed, it was voted to recommend to the Association that the following person be elected to active membership:

A. J. Munn, D.V.S. (Kansas City Vet. College, 1904), Fayette, Mo. Vouchers, A. T. Kinsley and S. Stewart.

Voted, that we recommend that the following persons be reinstated as members of the Association:

C. C. Mills, D.V.S. (Chicago Vet. College, 1890), Decatur, Ill. Vouchers, L. A. Merillat and A. H. Baker.

W. H. McKinney, D.V.S. (Chicago Vet. College, 1888), Kansas City, Mo. Vouchers, R. C. Moore and B. F. Kaupp.

Voted, that we recommend that the application of Dr. Armstrong be returned to him by the Secretary with a request that he have same properly endorsed.

Voted, that the Committee adhere to its former action, and recommend to the Association that the following recommendation of the Committee on Intelligence and Education be disapproved, to wit: "That, whenever in the opinion of the Association its finances will permit without embarrassment, the President shall appoint one or more members to visit and investigate the methods in vogue at the various schools, and report his or their findings to the Association—all to be done at the expense of this Association."

Voted, that we recommend that the application of Dr. Henry C. Gardner, of Bozeman, Mont., be laid upon the table until the next meeting of the Association.

Voted, that we recommend that the application of Dr. I. E. Newsom be laid upon the table until the next meeting of the Association.

Voted, that we recommend to the Association that Article I of the By-laws be amended by inserting a new section to be known as Section 4, and to read as follows: "He shall annually appoint a Corresponding Secretary, whose duty it shall be to make and maintain a list of the veterinarians of America eligible to membership in this Association, and to endeavor to secure applications for membership in this body therefrom."

Voted, that we recommend that Sections 4, 5 and 6 of the present article be renumbered so that the proper numerical order of the sections shall be maintained.

Voted, that we recommend that the actual hotel and travelling expenses incurred by the Secretary in attending the meetings of the Association be paid by this organization; provided, however, that said expenses shall in no case exceed the sum of one hundred dollars. Payment of such expenses shall commence from and include those incurred for attending the annual meeting of 1907.

Voted, that the following recommendations contained in the report of the Secretary be approved, and recommended to the Association for adoption:

1st. That this Association definitely prescribe that the sum of $9.00 shall accompany all applications for reinstatement, and that this sum shall pay for dues obligated prior to suspension, and pay dues one year in advance, and that all those obtaining their active membership by process of reinstatement shall, before becoming duly qualified, again sign the Constitution and By-laws as provided for new members.

2d. That we recommend to the Association that Section 9 of Article V relating to the duties of Resident Secretaries be amended so as to read as follows: " Each resident State Secretary shall annually submit to the Committee on Intelligence and Education a report concerning recent veterinary facts and prevalent diseases within his jurisdiction, and shall aid the President and Secretary by the performance of such other duties as they may direct."

3d. That the Membership Data Book, compiled by the Secretary and presented to this meeting, be considered the official record book of the Association.

4th. That J. C. Myers, C. W. Crowley, Benj. McInnis, W. J. Coates, D. J. Dixon, F. H. Osgood, F. W. McLellan and W. A. Sherman be placed upon the Honor Roll of this Association.

5th. That the names of A. Liautard, C. Burden, O. H. Flagg, I. Michener, J. Penniman, J. H. Stickney, E. F. Thayer, Robert Wood, R. J. Saunders, T. K. Very, J. D. Hopkins and C. P. Lyman be placed upon the Honor Roll.

6th. That a committee of this Association be appointed to consider Section 2 of Article VI of our By-laws in reference to what will constitute eligibility for membership in this Association.

On motion the Committee adjourned *sine die.*

RICHARD P. LYMAN,
Secretary.

DR. WM. HERBERT LOWE: Mr. President, I move you, sir, that we receive the report of the Executive Committee and take up the recommendations seriatim. Seconded. (Carried.)

DR. HOSKINS: I move that the By-Laws be suspended and that the Secretary be instructed to cast the vote of the Association for the election of Dr. Munn to active membership and also for the reinstatement of Drs. McKinney and Mills. Seconded. (Carried.)

SECRETARY LYMAN: In accordance with your vote I now cast the ballot of the Association for the election of Dr. Munn to active membership and the reinstatement to membership of Dr. McKinney and Dr. Mills.

PRESIDENT LAW: I declare them duly elected.

DR. W. H. LOWE: I move that we accept the recommendation that the Secretary return the application of Dr. Armstrong with the request that he have the same properly endorsed. Seconded. (Carried.)

Secretary Lyman reads: "Voted, that the Committee adhere to its former action, and recommend to the Association that the following recommendation of the Committee on Intelligence and Education be disapproved, to wit: 'That, whenever in the opinion of the Association its finances will permit without embarrassment, the President shall appoint one or more members to visit and investigate the methods in vogue at the various schools, and report his or their findings to the Association,—all to be done at the expense of the Association.'"

Dr. Stewart: I move that the recommendation of the Committee be adopted. Seconded. (Carried.)

Dr. Hoskins: I move that the Association concur and recommend that the application of Dr. Henry C. Gardiner of Bozeman, Montana, be laid upon the table until the next meeting of the Association. Seconded. (Carried.)

The proposed amendments to the By-Laws recommended by the Executive Committee were laid over for a year.

It was voted to adopt the recommendation from the Executive Committee providing further remuneration for the Secretary.

The recommendations contained in the report of the Secretary and endorsed in the Executive Committee report were considered and adopted by the Association.

Dr. A. T. Peters: I move, Mr. President, that we adopt the report of the Executive Committee as a whole. Seconded. (Carried.)

Secretary Lyman: I have here three applications for membership in the Association that bear the endorsement of a majority of the members of the Executive Committee. They have been handed to me since the adjournment of that Committee. The applicants are Dr. L. W. Goss, D.V.M. (Ohio State University, 1905), Dr. O. W. Noyes, D.V.S. (Kansas City Veterinary College, 1904), and Dr. O. O. Wolf (Chicago Veterinary College, 1898). I offer them, Mr. President, for consideration by the Association.

Dr. S. Stewart: I move that the rules be suspended and that the Secretary be instructed to cast the ballot of the Association for the election of these gentlemen to active membership. Seconded. (Carried.)

Secretary Lyman: According to your vote I cast the ballot of the Association for election to active membership in this Association the gentlemen whose names I have just presented to you.

President Law: I declare them elected.

Secretary Lyman: I have here a recommendation that we recommend that Section 1 of Article VI be amended by striking out the words, "Said application must be in the hands of the Secretary at least thirty days before the third Tuesday of August," signed G. R. White and R. P. Lyman. That goes over to be passed upon next year.

Dr. Peters: If permissible at this time, Mr. President, I would like to read the report of the Resolutions Committee. See Reports of Officers and Committees.

President Law: What shall we do then with the resolutions which have been introduced?

Dr. Stewart: I move that they be received and referred to the Publication Committee. Seconded. (Carried.)

Dr. Reynolds: I move to amend Section 3 of Article VI by inserting before "My residence is" the following: "My preliminary education was as follows: I spent............months in actual attendance at each of the following veterinary colleges.."
This is signed by Dr. Hoskins and myself. This inserts in the application blank, which is signed by the applicant, and which goes before the Executive Committee, this additional matter, and which shall give the committee the information which is always needed in consideration of individual candidates. I move that the By-Laws be suspended, and this amendment be adopted. Seconded. (Carried.)

President Law: The next order of business is the report of the Committee on Necrology. See Reports of Officers and Committees.

Dr. Dalrymple: Mr. President, if I am in order, I want to say that I have been requested by letter from Dr. Monsarrat to extend a most cordial invitation to this Association to hold its next meeting in the city of Honolulu, Hawaiian Territory.

Secretary Lyman: Carrying out that idea, I have here invitations to the Association to hold its next annual meeting in Albany, N. Y.; Chicago, Ill.; Atlantic City, N. J.; Seattle, Wash.; Columbus, Ohio; Detroit, Mich., and from the Chamber of Commerce of the city of Buffalo.

Dr. Hoskins: I wish to warn you that you will receive a very pressing invitation from the city of Philadelphia, Pa., to hold the meeting of 1908 in that city. You will hear more of that in the future.

Dr. Piatt: I would like to extend an invitation for the Association to come to Lexington, Ky.

President Law: All that remains then is to inaugurate the incoming President. I shall nominate two ex-Presidents to conduct him to the platform, Dr. Bell and Dr. Hoskins. It gives me very great pleasure, sir, to hand over this emblem of the office into your care and keeping. My own period of service has been rendered a very pleasant one, and I feel gratified in the highest degree that I should be succeeded by a man of the stamp of my worthy successor, and a man who is so well known for his learning and ability in the south as well as the north.

Dr. Dalrymple takes the chair.

President Dalrymple: Fellow-Members and Fellow-Workers: Something happened the other day. I have been trying to realize the importance of it. But I have not been successful, and my mind has been so distracted by thinking about it that I have been unable to concentrate it enough to get more than a few fitting words together to say to you at this time. I would not be human, however, did I not feel that I owe an immense debt of gratitude to this Association for this honor, the greatest honor, the highest gift within the veterinary profession conferred upon me by this great Association. My mind running along industrial lines, rather than lines political, I feel to-day that I would rather be President (or your servant) of the American Veterinary Medical Association than I would be of the United States of America. I feel that I am perhaps safer anyhow, because as I go along through the country during the next year I do not suppose I will need so many secret service men around me.

We have a great work to perform. As I look over this Association I cannot help but think to myself that this great body of men has a message to impart to the world of the deepest interest, and that this great profession of ours has a mission for the uplifting of humanity of no mean importance to perform,—because that is what we are after, that is the end and object of it all, the uplifting of humanity. We have an immense work to perform. As I mentioned in my little talk the other day, not only is it of great importance to our individual interests, but of great importance in carrying forward the great sanitary work of the country, and the conservation of the public health. In fact, it all means going right down to the bottom. It means the benefit, not only of our dumb servitors, but of humanity as well. It seems to me that it is a noble thought that whatever our efforts are the result is uplifting, the betterment of humanity, and that is what we are trying to do.

Now, of course I, as your servant, simply, singly and individually, can do very little. I hope the Association will realize that, and that a spirit of unity will prevail among us to a greater extent than ever. In union there is strength. Let us throw aside all little dissensions, if there may be any, and let us work together singly and individually, for the accomplishment of the work which we are to perform. Let the man who has perhaps the smallest talent unite with those who have more, and the result will be gratifying, I am sure. As in the old nursery rhyme,

"Little drops of water,
  Little grains of sand,
Make the mighty ocean
  And the beauteous land,"

each man meets his fellow at some point, and if he exerts what little influence he has in this direction and does it well, he deserves just as much credit as the man of many talents who wields a large influence.

Gentlemen, I thank you for this very great honor, an honor which is not only individual in its character, but I know it is one that will be appreciated in my section of the country also. I thank you.

The next in order is the escorting of the Vice-Presidents-elect to the platform. I will appoint Dr. Reynolds and Dr. A. T. Peters to escort Dr. Melvin, whom I believe is the first in order, to the platform.

VICE-PRESIDENT-ELECT MELVIN: Mr. President and Gentlemen: I wish to thank you, gentlemen, and fellow-members of the Association for having conferred this very high honor upon me. I appreciate it all the more in that regard. I trust sincerely that both our worthy President and myself will be with you next year at whatever place it may be.

PRESIDENT DALRYMPLE: As the Vice-Presidents-elect Drs. D. C. Moore and J. H. McNeil are not in the room, I will ask Dr. Reynolds and Dr. G. R. White to escort the next in rotation, Dr. Archibald, to the platform.

VICE-PRESIDENT-ELECT ARCHIBALD: Mr. President and Gentlemen: On my own behalf and on behalf of the veterinary profession of California, I wish to thank you for the high honor conferred. This is the first meeting of this Association that I have had the honor to attend, and am sure that I have enjoyed it thoroughly, and appreciate very much your kindness to all of the California delegation present. I thank you.

President Dalrymple: The next is a gentleman with whom you are all familiar, Dr. C. A. Cary of Auburn, Ala. Unfortunately, Dr. Cary is not in the room. The next is the Secretary, Dr. R. P. Lyman.

Secretary Lyman: Mr. President and Gentlemen: I feel as though I had invited myself. The President just asked me if there was anybody else, and I told him, "Yes, Secretary and Treasurer." But I am not going to inflict any speech upon you, already feeling, after the experiences of the last few days like a jack-in-the-box in this position, and that you have heard enough of me for a while. I want to thank you, however, for again electing me as your Secretary, and further than that, I thank you for the help and aid which you have given in securing this one hundred and fifty new applications. I believe if the members will continue to put forth an effort towards the elevation and advancement of this Association that we shall soon be able to accomplish much more than we have. I assure you that I will do everything I can toward that end, and asking your co-operation will try to arrange for a good meeting another year. Thank you, gentlemen.

President Dalrymple: I will ask Dr. Reynolds to escort to the platform Dr. G. R. White.

Dr. G. R. White: Mr. Chairman, I have no speech prepared, and it is getting late. So I will conclude my address by thanking you all for your continued confidence.

President Dalrymple: The Chair is not prepared to announce all of the committees, but desires at this time to announce the Executive and the Publication Committees. The Secretary will kindly read the appointments.

Secretary Lyman then read the appointments upon the Committees mentioned. They are listed among the committee appointments.

President Dalrymple: If there is no further business before the meeting, a motion to adjorn will be entertained.

Dr. Stewart: I move that we adjourn. Seconded. (Carried.)

Reports of Officers and Committees.

REPORT OF THE SECRETARY.

By RICHARD P. LYMAN,
Hartford, Conn.

The scope and influence of this Association becomes annually more widespread; applications are to-day on file from States heretofore unrepresented. I would suggest that the Association recommend to the incoming executive additions to the list of Resident Secretaries, for it is by utilizing these marks of progress that the value of the Association is enhanced and the general practitioner and national organization are brought into closer relationship. It is possible at this time to add Resident Secretaries to the States of Georgia, Idaho, Utah, Wyoming, Oklahoma, New Mexico and to the province of New Brunswick.

Reinstatement.—This Association has from time to time been compelled to disqualify from active membership privileges and erase from the roll many members owing to failure to remit their annual dues. It is encouraging to note that this list annually has a tendency to become less lengthy; especially during the past year has the membership remained practically intact, only eleven active members were for this cause suspended.

For a number of years past it has been customary to reinstate applicants that have considered membership of sufficient value to pay their arrearages, and, indeed, in some instances, this sum has amounted to no small consideration undoubtedly consequent upon a desire of those in charge of the direction of the Association to save valuable members even though it has long since been specifically stated that those eighteen months in arrears should be dropped. Because of a lack of accurate information bearing upon the exact indebtedness of each individual applying for reinstatement and moreover because such delinquent did virtually by a by-law adopted by this Association cease to be a member when two years in arrears, I would recommend that this Association definitely prescribe that the sum of $9.00 shall accompany all applications for reinstatement; that this sum shall pay for dues obligated prior to suspension and pay dues one year in advance as elsewhere specified for membership dues, and, further, that all those obtaining their active membership by process of reinstatement shall, before being duly qualified, again sign the Constitution and By-laws as provided for new members.

Membership Data Book.—Members may recall the recommendation from the Finance Committee of 1906, considering the advisability of a revised ledger system; for this reason and further because of the congested condition of the ledger turned over by my predecessor it seemed advisible to open a new and revised book. Taking advantage of the opportunity and convinced that this Association was worthy of a membership data book suitable for complete membership reference, durable, clear and compact, your Secretary formulated a revised system which he laid before your worthy President and, meeting with his approval, inaugurated. This data book embodies all the names of past and present active and honorary members, a record of time of admission, resignation, suspension, reinstatement, attainment of honor roll privileges, expulsion or death; likewise a record of yearly dues, as well as a space reserved for special or specific historical data of the individual. The one hundred and fifty pages under one cover are so tabulated as to be suitable for years to come permitting an entry of 6,000 names. The book gives to date summary information of each individual as far as was found possible from 1863 and this in a manner that cannot but be found advantageous to committees or officers when called upon to investigate the record of the individual.

Although the work of compiling these statistics was laborious and detailed, your Secretary has endeavored to make them as accurate as was possible with the records so cheerfully furnished by the Librarian, Dr. W. L. Williams, and by further individual aid from several long-time members. The volume is submitted to this body with the suggestion that if found worthy it be made the official membership record book and further that a suitable metal container be purchased for its preservation.

Concerning Honor Roll.—It was while engaged in compiling the membership data book that your Secretary appreciated the wisdom of the recommendation made by Dr. W. H. Lowe in his

Presidential address, viz.: "That the honor roll be so construed as to more especially include the members for meritorious record, this either in his professional field or in relation to this Association." I am thoroughly convinced that as now provided the honor system is detrimental to the organization and capable of improvement. I would elaborate even further than suggested by Dr. Lowe and recommended that the By-laws pertaining to this provision be altered so that members of this Association that have distinguished themselves either by valued work in connection with this organization or in the field of veterinary science be eligible to honor roll privileges, also that members that have for twenty-five consecutive years been connected actively with this Association shall be entitled thereto and further that the payment of annual dues but not assessments shall be optional with such members as may have attained honor roll privileges consequent upon the twenty-five years' membership.

Application for Honor Roll.—Since the honor system was inaugurated it has been customary for the Secretary to wait for the entitled recipient to make formal application. It is respectfully requested that this body definitely direct what shall be the procedure; shall this custom be continued, shall members that are entitled to such qualifications be notified to make application, or, again, shall your Secretary annually and unsolicited inform this Association who is eligible? This is not now provided for in the By-law creating the honor roll, and I would inform this body that the following gentlemen, although having attained the right, have not as yet been placed thereon: J. C. Myers, active 32 years; C. W. Crowley, 31 years; Benj. McInnis, 31 years; W. J. Coates, 30 years; D. J. Dixon, 26 years; R. H. Harrison, 26 years; F. H. Osgood, 26 years; F. W. McLellan, 25 years; L. H. Howard, 25 years, and W. A. Sherman, 25 years.

Earlier Members and the Honor Roll.—It would seem worthy at this time to consider the status of some of the earlier members of this Association and by adequate motion make the honor roll provisions sufficiently retroactive that we may recognize the valued efforts of the individual in his zealous attempts to elevate his profession and enhance the interests of this, his Association.

That this thought may properly come before this body for consideration, your Secretary asks the privilege to recommend that at this meeting certain of our earlier members, whose names are included herein, be placed upon the honor roll of this organization. It would seem but just that we consider the value of their efforts, and although possibly in some instances the individual in our zeal may have been accorded honorary membership, it certainly seems feasible to place him or them on record in such manner that the identity may not pass away with the individual but have lasting recognition on the records of this Association.

Bearing out this thought, I would recommend that we place upon our honor system the name of A. Liautard, an organizer and active worker, a man that served this Association in many important capacities, including Secretary and President, during the thirty-seven years that he retained his active membership. Dr. Liautard resigned his membership but not his interests in 1900, after having attained the distinction of holding the longest record of activity in this organization.

C. Burden, an organizer and active worker for thirty-six years, during which period he was honored with the trusts of Secretary and Treasurer, dying in active membership in 1901.

O. H. Flagg, an organizer and most constant attendant for thirty-three years, dying an active member in 1896.

I. Michener, an organizer, elected an honorary member seven years preceding his death in 1899.

J. Penniman, an organizer and member for thirty-three years.

J. H. Stickney, an organizer and the first President of the United States Veterinary Medical Association, dying in 1900, following thirty-six years of activity in the interests in the organization.

E. F. Thayer, President from 1869 to 1871, an organizer and constant member until the time of his death in 1889.

Robert Wood, an organizer and an active member for twenty-seven years, serving the Association as President from 1867 to 1869.

R. J. Saunders, elected to this Association in 1871, and died after remaining in good standing for twenty-eight years.

T. K. Very, who for twenty-six years following his election to membership in 1872 worked for the interests of the Association.

J. D. Hopkins, Secretary from 1874 to 1877, and remained active twenty-five years subsequent to his admission in 1873.

C. P. Lyman, twenty-nine years an active member and President from 1877 to 1879.

Eligibility of Applicants.—The present policy of censorship over American veterinary institutions is praiseworthy and will in all likelihood redound to higher matriculation and advanced veterinary training, nevertheless, it would seem advisable for this body to suggest some definite or specific requirement for eligibility of applicants to this Association. When a certain veterinary school or college falls into disrepute and this Association rules that its graduates shall be forbidden admission, are we to construe this ban as retroactive or shall it refer only to graduates subsequent to such action?

Prior to this time this provision has been possible of either interpretation and consequently applications have been refused from candidates whose graduation antedates members of the Association in good standing from the same institution. Such ruling is ambiguous if not embarrassing and must be immediately adjusted.

Along this line it is suggested that the Executive Committee be instructed to annually submit to the Secretary a list of all institutions whether then operative or not whose graduates shall be eligible to membership.

Furthermore, it appears that Section 2, Article VI, which refers especially to eligibility of applicants for membership is so broad in its interpretation and liable to place our Resident Secretaries in an exceedingly embarrassing and unfavorable light. As worded, three years of six months each and four veterinary instructors constitutes eligibility. The fulfillment of this requirement may be advertised, recognized by a number soliciting an application and none the less, the institution falls far short of any of the principles and aims that this Association is now endeavoring to inculcate. I would earnestly recommend an entire readjustment of our admission requirements and a revision to a system that our veterinary institutions can find possible of but one interpretation.

By-Laws.—It would seem to your Secretary that there are at least glaring errors in the By-laws of the Association. There is absolutely no adequate provision for filling vacancies among the officers, should such occur during the interim between the annual meetings; again, you will observe that no provision is made in Section 5 of Article XII in relation to an alteration of the By-laws, specifying what shall constitute a vote.

During the early part of my fiscal year members of the Association were asked to vote upon an alteration of Article VI, Section 1, of the By-laws, which has special reference to the time of holding the annual meetings. Upon application to the Association, referred and regularily approved by the Executive Committee, it was recommended that the By-laws be altered, changing the annual meeting from the third Tuesday of August to the second Tuesday and following days of September. A postal card vote was solicited, closed by special announcement, counted, and resulted in an overwhelming majority for changing the date to meet in September.

New Members.—During the past year this office has endeavored to increase the number of active members and thanks to the energy of many of the Resident Secretaries, in full appreciation of their opportunities, our work has been productive of such results that we are enabled to present to this meeting for your consideration the largest number of applications in the history of the Association, totaling considerably over the hundred mark.

Painstaking research and aid cheerfully rendered by the several Resident Secretaries has exposed that there are to-day something over 3,800 eligible practitioners in this country that are not and never have been affiliated with the A. V. M. A. To those conversant with the advantages gained by membership, even though an individual is forced to forego attending the annual conclave, it suggests that there is a flaw in our missionary system.

This membership consideration is an all-important question and well worthy of your most detailed debate. The enormous task of securing names and addresses and corresponding with veterinarians throughout this continent precludes the possibility of detailing such work upon the Secretary whose duties are even now all too onerous. More properly, in the opinion of the Secretary, might this proposition be met by a membership committee, or the creation of a specific office, the incumbent of which to work in coalition with the Resident Secretaries.

Annual Dues.—I cannot close my annual report without calling your attention to a few salient points in reference to the annual dues. Your Secretary has been somewhat disappointed in the delinquency of members in paying their annual obligations. Our yearly prospective income is abundantly sufficient to enable this organization to meet its entire indebtedness, but, on the other hand, it is a disgrace for an association of our magnitude to be so continuously hard up and, furthermore, it is unfair to harass and put the burden of forced pleading collections upon your officers. The members should bear in mind that the transcript of the annual meeting cannot be accomplished without considerable outlay and can and should be paid for when the bill is presented, also the conduct of the committees and officers' affairs require consideration.

It is a good sign to report that the delinquents subject to suspension during the past year reached the lowest figure, to my knowledge, in the history of the Association, none the less, the amount of outstanding presumably available funds exceeds the four figure mark. Kindly bear this in mind, and, when you are called upon to add your mite, do not delay. Do your part towards keeping our credit unimpeachable, and remember we deal with business people and desire to demonstrate that we are business men.

Railroads.—In justice to myself I feel that a word relating to railroad rates is pertinent. Unquestionably, the members have noted my failure to secure the usual reduced rates. Negotiations have been practically continuous since my first correspondence December last, but, owing to the recent legislative enactments in several states, it has been absolutely impossible to obtain concessions from any source. The railroads have all exhibited such beautiful unanimity of action that we encountered on all sides the same expressions and refusal to each and every one of the several propositions submitted; certainly, in unity there is strength.

I feel that your Secretary would be exceedingly lacking in courtesy should he fail to acknowledge his appreciation to those members and especially the Resident Secretaries that have so cheerfully coöperated in the work of the past year. Thanking the members for the many favors extended, I have the honor, Mr. President, to submit this, my annual report.

REPORT OF THE TREASURER.

By GEORGE R. WHITE,
Nashville, Tenn.

1906. **Receipts.**	
August 21, Balance in bank at last Report	$1,570 32
August 23, Received from J. J. Repp, Secretary	165 00
September 6, Received from J. J. Repp, Secretary	1,082 58
November 20, Received from R. P. Lyman, Secretary	300 00
1907.	
May 5, Received from R. P. Lyman, Secretary	450 00
August 20, Received from R. P. Lyman, Secretary	1,265 72
Total Receipts	$4,833 62

1906. **Disbursements.**	
August 23, To R. P. Lyman, Hartford, Conn., for expenses incurred attending New Haven meeting	$ 70 58
August 23, To W. Horace Hoskins, Philadelphia, Pa., for addressing envelopes	15 00
August 23, To Otto G. Noack, Reading, Pa., for expenses as Resident Secretary, of Pennsylvania	8 75
August 23, To J. J. Repp, Philadelphia, Pa., for stamps	19 00
August 23, To J. J. Repp, Philadelphia, Pa., for expressage, stamps and envelopes	26 75
August 23, To J. J. Repp, Philadelphia, Pa., for stamps, printing, expressage, drayage and salary	381 25
September 2, To G. R. White, Treasurer, Nashville, Tenn., for expenses as Resident Secretary for Tennessee and expenses as member of Committee on Intelligence and Education	5 00
September 2, To Miss Aurora Taft, Nashville, Tenn., for typewriting reports by G. R. White, Treasurer	5 00
September 2, To B. L. Foster Co., Nashville, Tenn., for printing envelopes and letterheads for Treasurer's office.	4 00
September 2, To Samuel D. Holt, Philadelphia, Pa., for engrossing Certificates of Membership	12 10
September 2, To The William H. Hoskins Co., Philadelphia, Pa., for paste, erasers, carbon paper, etc	2 90
September 2, To Case, Lockwood & Brainard Co., Hartford, Conn., for zinc plates and half-tones	44 15
September 7, To Case, Lockwood & Brainard Co., Hartford, Conn., for printing Annual Report of Proceedings 1905 meeting	1,115 43
Carried forward	$1,709 91

Brought forward	$1,709 91
September 19, To Miss Aurora Taft, Nashville, Tenn., for typewriting for Committee on Intelligence and Education	5 20
September 20, To James T. Camp, Nashville, Tenn., for printing for Committee on Intelligence and Education, by G. R. White	6 00
September 21, To Magee Bros., Philadelphia, Pa., for printing, by J. J. Repp, Secretary	101 11
October 14, To W. L. Williams, Ithaca, N. Y., for expressage and postage	8 53
October 14, To M. H. Reynolds, St. Anthony Park, Minn., for typewriting report of Committee on Resolutions	90
October 15, To G. E. Corwin, Jr., Canaan, Conn., for fees returned	8 00
October 15, To Geo. T. Irons, South St. Paul, Minn., for fees returned	8 00
November 16, To L. Pease & Co., Hartford, Conn., for printing by-laws, receipts, applications and postals	41 75
November 16, To Chas. F. Roberts, New Haven, Conn., for services, New Haven, Conn., meeting	141 75
November 16, To Samuel D. Holt, Philadelphia, Pa., for engrossing Certificates of Membership	12 30
November 29, To J. F. DeVine, Goshen, N. Y., for stationery, stamps and typewriting	7 50
December 17, To J. J. Repp, Secretary, Philadelphia, Pa., for stamps	6 00
1907.	
February 8, To L. Pease & Co., Hartford, Conn., for printing, by R. P. Lyman, Secretary	18 75
March 30, To J. B. McKee & Co., Nashville, Tenn., for Treasurer's bond	10 00
May 5, To C. J. Marshall, Philadelphia, Pa., for expenses as Chairman Publication Committee	64 00
July 12, To Geo. F. Lasher, Philadelphia, Pa., for printing, binding and mailing Proceedings of 1906 meeting	1,035 10
July 12, To Geo. F. Lasher, Philadelphia, Pa., for 500 copies Constitution and By-laws	15 00
August 16, To Case, Lockwood & Brainard Co., Hartford, Conn., for printing, by R. P. Lyman, Secretary	189 90
August 16, To Foster, Webb & Parkes, Nashville, Tenn., for record book, by G. R. White, Treasurer	1 75
August 16, To G. R. White, Nashville, Tenn., for expenses as Treasurer and Resident Secretary	6 50
August 17, To Case, Lockwood & Brainard Co., Hartford, Conn., for printing letter circular, by R. P. Lyman, Secretary	9 25
Carried forward	$3,407 20

	Brought forward		$3,407 20
August 17,	To R. P. Lyman, Secretary, Hartford, Conn., for expenses as Secretary		89 30
	Total Disbursements		$3,496 50
	Total Receipts	$4,833 62	
	Total Disbursements	3,496 50	
	Balance in bank	$1,337 12	

Kansas City, Mo., August 10, 1907.

REPORT OF THE FINANCE COMMITTEE.

By THOMAS BLAND, Chairman, CHARLES E. COTTON, A. H. BAKER.

The Secretary's books show $514.25 on September 6, 1907, not yet turned over to the Treasurer. Since September 6, 1907, bills have been received by him amounting to $115.10, which appears to be the extent of our present indebtedness. The method of book-keeping adopted by Secretary Lyman is a very commendable one, making it very easy for any auditing committee to get a clear and quick understanding of the assets and liabilities of this association.

The books of your treasurer, George R. White, show the following total of receipts, disbursements, and balance in bank to September 10, 1907:

Total receipts	$4,833 62
Total disbursements	3,496 50
Leaving a balance in the bank of	$1,337 12

Kansas City, Mo., Sept. 10, 1907.

REPORT OF LIBRARIAN.

By W. L. WILLIAMS,
Ithaca, N. Y.

The only action of the librarian during the past year which demands record has been the distribution of the Proceedings of the Society, as follows:

On hand at last report or received during the year	1893	1896	1897	1902	1903	1904	1905	1906	Total
Distributed	5	2	26	5	13	49	67	82	249
	5	2	5	5	7	8	11	29	72
On hand	0	0	21	0	6	41	56	53	177

It is interesting to note that during the past year a greater number of copies of the Procedings have been sold to non-members than during any prior year in our history, which indicates that our records are becoming more appreciated.

A glance at the list of copies on hand and those distributed will show also that, were all the new members of any one year to ask for files of the Proceedings, there would not be enough to supply the demand for the one year.

As our membership increases, more and more copies of the Proceedings fail to reach the addressee largely because some members fail to advise the Secretary of changes in address.

REPORT OF THE PUBLICATION COMMITTEE.

By C. J. MARSHALL, Chairman; A. M. FARINGTON, E. M. RANCK, J. B. PAIGE, and R. P. LYMAN.

The members of this committee were regularly informed of their appointment soon after the New Haven meeting. The stenographer, Mr. Charles F. Roberts, whose services were secured by the retiring committee, turned the minutes and papers of the New Haven meeting over to the chairman of this committee promptly after his appointment and in good form.

A letter soliciting bids was sent to six different publishing houses in various parts of the country. The proposition made by George F. Lasher, 147 North 10th St., Philadelphia, seemed the most feasible to your committee; consequently he was awarded the contract. His bid was as follows:

Dr. C. J. Marshall,
2004 Pine St., Philadelphia.

Dear Sir:

Your favor of the 13th instant received, and we quote as follows on the American Veterinary Medical Association report as per your specifications.

750 copies, 500 pages, one half-tone insert, bound in cloth, wrapped and addressed for express or mail as per your sample copy	$890 00
100 additional copies, 500 pages	30 00
We will charge or allow for additional or less pages, per page	1 40
We will furnish 750 copies additional inserts and bind same in book for, per page	2 50
Time work making alterations, if any, per hour	60

Postage and express or freight will be charged at cost.

We will be pleased to receive your order. We understand that there will be about the same proportion of rule and figure and small type pages in your 1906 book as there are in your 1905 book.

Yours truly,

GEORGE F. LASHER.

There was considerable delay in getting the work to the publisher. This was due to the fact that your chairman was not an experienced editor. He wishes to take this opportunity to thank his predecessor, Dr. R. P. Lyman, for the valuable assistance given in this work.

The plan of editing and grouping the work is practically the same as has been followed for the last few years. You have observed, no doubt, that more of the work appears in small type, than in former years. The minutes of the meeting and all discussions were put in eight-point type. This was done in order to give reports and papers a more conspicuous place.

In some respects the 1906 report is not up to as high a standard of workmanship as some of the preceding reports, yet in the matter of expense the results were very satisfactory. The expense was kept down from the fact that there were but few illustrations, and in most cases the authors furnished the cuts.

The item of time work is large. This is due in part to the fact that additions were made to two papers after the galley had been set up, and there was also a misunderstanding in reference to the size type to be used in printing the minutes.

The following is the itemized expense of the publication:

Charles F. Roberts, Stenographer.		
August 20, 1902, Attendance upon Executive Committee	$10 00	
August 22, 23, 24, 1906, Attendance upon Executive Committee	30 00	
To 814 folio copies, Report of Proceedings, at 12½ per folio, copy and duplicate	101 75	$141 75

George F. Lasher, Publisher.		
750 copies, 500 pages and half-tone insert as per estimate	890 00	
100 additional copies	30 00	
10 inserts half-tone additional, 850 copies, at $2.75	27 50	
116¾ hours time alterations, at 60 cents	70 05	
One half-tone portrait and signature President Lowe	6 00	
Three reproductions, white on black charts, pages 310 and 311	7 00	
Postage and expressage	95 20	
		$1,125 75
Incidental Expenses.		
C. J. Marsall, New Haven and return	31 50	
Typewriting, postage, telepone calls and traveling expenses	34 00	65 50
Total expense		$1,333 00
Received from Dr. P. A. Fish for cuts		3 50
Total expense of 850 copies of the 1906 Report.		$1,329 50

The total cost per copy is $1.56.

The average total cost of each copy of the report for the past ten years is $1.40. The lowest price during that time was in the year 1897. This report contained 272 pages and cost the Association $1.03 per copy. The highest price paid during this time was $1.90 for a report that contained 506 pages.

The report could be gotten up much better for more money. There seems to be no way discovered to get it out much cheaper.

The Chairman of the Publication Committee sent the same form of letter as has been sent years before to five different stenographers soliciting bids for reporting the present meeting in Kansas City.

Mr. Charles F. Roberts, New Haven, Conn., gave the estimate that was considered best by your committee and was consequently awarded the contract.

REPORT OF THE COMMITTEE ON INTELLIGENCE AND EDUCATION.

LEONARD PEARSON, CHAIRMAN; D. A. HUGHES, M. H. REYNOLDS,
GEORGE R. WHITE, ADOLPH EICHORN.

REPORT BY LEONARD PEARSON,

Chairman, Philadelphia.

For the last few years your committee on Intelligence and Education has published statistical statements and descriptions of the work of the various veterinary schools in North America. These statements have furnished information that has been drawn from the catalogues of the various institutions, from replies made by representatives of the institution in response to inquiries from your committee and reports from members of this association appointed to visit the different schools. From the information obtained through these and other channels, each member of this association, and every progressive veterinarian of the United States, must have a fair conception of the quality of work that each school is prepared to do and he must be informed, in a general way, as to the kind of work that each school is actually doing. On this account no effort has been made to obtain and to detail statistical information in regard to the schools. In fact, it is scarcely possible to obtain information of real value, in addition to that which is already contained in the records of the recent meetings of the association, without going to the expense of sending around to all of the schools an impartial visitor. This expense your committee was not authorized to incur.

It is, therefore, assumed that the present status of the schools is well known to you. This assumption will obviate the painful necessity of considering each of the schools separately, with the view of pointing out its excellencies and its defects. Such a duty would, indeed, be a painful one, because the defects so enormously outweigh the excellencies. Without entering, in this report, upon a criticism of individual schools, it is proposed to outline briefly the organization, equipment and budget of what might be termed *an adequate* veterinary school; that is to say, a school organized and equipped to conduct its work in a way that would adequately comply with the proper demands upon such an institution and thus to furnish a standard for measuring each school.

The outline that follows is not utopian, nor is it even ideal, but it is intended to be of such a plain business-like statement as might be prepared in response to a request to furnish a sketch of what is needed in order that the veterinary sciences may be taught in an adequate manner and in a way that is proportionate to the needs of the country and in harmony with the development of modern technical and professional schools. With such an outline, each member of the profession can measure the efficiency of a given school, and the relative merits of different schools can be compared.

A veterinary teaching institution may naturally be divided into three parts:

I. THE TEACHING BODY; II. THE MATERIAL EQUIPMENT; III. THE STUDENT BODY.

I. The Teaching Body.—The faculty and the subordinate teaching staff may be divided into natural groups according to the subjects taught. The following is suggested as an appropriate classification of the subjects of instruction and, hence, of the work of the teaching body:

ANATOMY	MEDICINE
PHYSIOLOGY	HYGIENE
PATHOLOGY	SURGERY

ANIMAL ENGINEERING.

It is proposed that all of the various branches of instruction shall be grouped under the above general headings. In more detail the classification would be as follows:

1. ANATOMY:
    - Histology;
    - Embryology;
    - Biology;
    - Zoölogy;
    - Statics and mechanics.
2. PHYSIOLOGY:
    - Chemistry;
    - Principles of nutrition;
    - Physiological action of drugs;
    - Materia medica;
    - Medical botany;
    - Pharmacy.

3. PATHOLOGY:
   - General pathology;
   - Special pathology;
   - Morbid anatomy;
   - Pathological histology;
   - Postmortem examinations.
4. HYGIENE:
   - General hygiene;
   - Special hygiene, including immunity;
   - Bacteriology;
   - Meat inspection;
   - Milk inspection;
   - Dairy farm inspection;
   - Epizoötiology.
5. SURGERY:
   - Surgical anatomy;
   - Surgical diagnosis;
   - Surgical pathology;
   - Operative surgery;
   - Horse-shoeing;
   - Obstetrics;
   - Clinics.
6. MEDICINE:
   - Physical diagnosis;
   - Laboratory diagnosis;
   - Principles and practice;
   - Special therapeutics;
   - Clinics.
7. ANIMAL ENGINEERING:
   - Animal production;
   - Breeds of animals;
   - Breeding animals;
   - Judging animals;
   - Stock farm management;
   - Hippology;
   - Meat packing and manufacturing;
   - Dairying, etc.

For their full development, a large number of men could profitably be employed in each of the above departments. It is not proposed to outline a classification to provide for research, but only for the practical work of veterinary teaching. With this in view, it appears that each of these departments should be taken care of by one professor and two assistants. This calls for a teaching force of 21 men. Undoubtedly, all of these teachers should devote their best energies to the work of the school. If they were permitted to accept outside employment, it should be only in the line of the subjects taught and should be limited in amount. The professor at the head of each of these departments should receive a salary of not less than $3000 ($3000 to $5000); the first assistant should receive a salary of not less than $1800 ($1800 to $2500), and the second assistant should receive a salary of not less than $1200 ($1200 to $1800). Therefore, the minimum charge for the salaries of the teachers in each of the seven departments amounts to $6000 a year. It is manifest that adequate work cannot be done for less, because it is impossible to conceive of the branches enumerated being properly taught by a smaller staff, no branch enumerated is superfluous and the salaries which form the basis of this estimate are minimum salaries, as measured by salaries now ruling for teachers engaged in more or less similar work in universities and agricultural colleges.

II. Material Equipment.—An adequate veterinary college must have a school equipment and a hospital, or clinical, equipment. The school equipment must comprise facilities for teaching all of the subjects excepting clinics under the seven headings. This calls for classrooms, laboratories and illustrative material. In order that the work may be conducted without interruption and delay, it is necessary that separate facilities shall be provided for teaching the different groups of subjects. For example, in the department of anatomy there must be a dissecting room and one or more laboratories in which histology, embryology and biology may be taught. In the department of physiology, there must be one or more laboratories for practical physiology, chemistry, toxicology and pharmacy. In the department of pathology, there must be facilities for making post-mortem examinations and there must be a well equipped laboratory for giving instruction in pathological histology. In the department of hygiene, there must be a laboratory for bacteriology and for teaching certain parts of meat and milk inspection. In the department of surgery, there must be ample facilities for clinical and for practical instruction. In the department of medicine, there must be opportunity for clinical instruction and for laboratory instruction as well, in relation to clinical examination and the newer and more scientific methods of diagnosis. In the department of animal engineering, there must be a laboratory and work room where students may be drilled in the examination and classification of foodstuffs, and of the various animal products, and in the study and tabulation of pedigrees. In connection with hippology, a collection of the various kinds of harness, bits, saddles, etc., together with facilities for adjusting and for illustrating the usefulness of the various constructions. In teaching the breeds of animals, the principle of breeding, judging animals, stock farm management, etc., it is difficult to see how the work can be done properly without the use of a well equipped stock and dairy farm.

There must also be a well equipped library, and each of the departments will need to have its own museum collection.

Without going into the details of the physical arrangement and the cost of such an equipment, which would depend largely upon local conditions, it may be said that the total cost would scarcely fall below $350,000. The cost of maintaining such an equipment and of supplying the various material needed for class instruction would amount, upon a minimum basis, to $33,000 a year. This amount added to the teachers' salaries makes a total of $75,000 a year as the least cost of maintaining an adequate veterinary school.

III. The Student Body.—In order that the teaching that is here outlined may be taken advantage of, it is necessary that the students shall come to the school as well prepared educationally as are the sturents entering upon other lines of scientific work of college or university grade. The general standard for students entering upon work in medicine, law, engineering, agriculture, etc., throughout the United States, is the equivalent of a high school course covering four years. It would appear that such a standard might properly be accepted in this connection. If the standard of admission were lower, the grade of the work of the school would be cast upon too low a plane. If the standard were higher, it would be too far in advance of the generally accepted standard for technical colleges in this country.

The duration of the course of instruction should be four years of nine months each.

It appears, then, that a veterinary school must have an equipment that cannot be provided for less than $350,000 and that it must have a budget of at least $75,000 a year if it is to be prepared to teach the veterinary sciences as thoroughly as is required by the needs of the public and the student. Such a school could teach 200 to 300 students.

At first sight, these estimates may seem to be large because, in this country, veterinary education has never been organized on anything like an adequate basis, and we have naturally fallen in the way of judging the subject by what we have, rather than by what is needed. If it is agreed that all of the subjects enumerated are necessary in the equipment of a modern veterinarian—a man prepared to meet satisfactorily the technical demands that properly fall upon the veterinarian of the present day—and if it is admitted that teachers cannot be compensated for the services required of them at salaries less than those stated, and that the material equipment described cannot be restricted excepting at the cost of efficiency, then it must be admitted that the total estimate is a minimum estimate of the cost of equipping and maintaining an adequate veterinary school.

By using this outline as a standard, one can determine to what extent the best of the American veterinary schools falls short of what is actually needed. In making such a comparison, however, it should not be based alone upon the budget of the school it is desired to measure, but rather upon the facilities for instruction and upon the actual grade of the work done, as compared with the work one could fairly expect from an institution organized in accord with the above outline. The reason for this is that some of our American veterinary schools are blessed by having among their teachers men who receive small salaries, or no salaries, but who work as faithfully and as diligently and as effectively as though they were receiving adequate compensation for their services. A man who does this, contributes, to the school, in effect, the amount equivalent to the difference between what he receives for his services and what they are worth. There are veterinarians, with the zeal of missionaries, who, in this way, contribute annually from $500 to $2,500 worth of services to the institution with which they are connected. If institutions are compared by their budgets, the value of contributions in service must not be omitted from the total of the income and disbursements of the institutions.

The standard for a veterinary school as outlined is similar to the standard in most of the countries of continental Europe.

Many of the European schools, however, have equipments far larger than the equipment here outlined, and their incomes are also much greater than here proposed. The equipment of the schools at Berlin, Hanover, Munich, Dresden, Buda Pest, Vienna and Alfort could not be duplicated in this country at an expense of less than $1,000,000 to $1,500,000. If European countries have found, after a century of experience, that these expenditures are justified, and they must have found that they are justified; because they are continually being increased, there can remain no doubt that similar expenditures in this country would be completely justified by the results they would render possible.

An argument of this sort is frequently met by the statement that one must not expect too much for "the veterinary sciences are young in this country" and that we cannot be expected to have as complete instituions for promoting these sciences as exist where they are older. Such a statement is based upon a misconception of the facts. Science is international, it knows no political boundaries. The discovery of the tubercle bacillus is as old in the United States as in Germany, where the discovery was made. The facts of anatomy, of physiology and pathology are as old here as in their original homes, and so with all of the elements that enter into the complex group known as the veterinary sciences. And since this is true of the parts, it is true of the whole. The veterinary sciences are of the same age in this country as everywhere else upon the earth. It is only the public recognition of the value of the veterinary sciences that is young and immature. Closer attention, in the light of the above statement, will show that while the veterinary sciences in this country have the appearance of having the immature stature of a boy, in reality they are comparable to an illy-nourished, dwarfed old man. The veterinary sciences do not lack age—they lack development.

THE RELATION OF THE QUALITY OF THE FACILITIES FOR VETERINARY EDUCATION TO THE STATUS OF THE VETERINARY PROFESSION.

In the long run, veterinarians will find themselves occupying the fields that they are better fitted to occupy than are men trained in other lines and in other schools. The future of the veterinary profession in the United States, as elsewhere, depends upon the ability of veterinarians to render useful and needed service. If veterinarians aspire to any given field of work, it is necessary that they shall be the best equipped to occupy that field.

It is illuminating but, at the same time, depressing, to run over the list of the seven departments of veterinary sciences, as given above, and inquire, as we proceed, how many American veterinarians are entitled to high rank in these various departments, or their subdivisions. For example, in pathology, a subject that underlies medicine, as anatomy underlies surgery, how many veterinarians in the United States are entitled to high rank? This field is the most important within the whole domain of the veterinary sciences, it is the one upon which the most typical and most important of our veterinary work pivots. The post-mortem work of the meat inspector is applied pathology, the diagnosis and treatment of diseases depend upon knowledge of pathology, the knowledge necessary for the recognition and control of animal plagues depends principally upon a solid foundation of pathology.

If we search for the leading men in the bacteriology of the diseases of animals, how many do we find in the ranks of the veterinary profession?

Where do we find the most complete, the most reliable and the most practical knowledge of the principles and practice of animal nutrition, a department of comparative or veterinary physiology?

Where do we find expert knowledge and professional skill upon subjects pertaining to animal husbandry and who are the recognized authorities in this field?

If a national meeting is called for a scientific discussion of milk and dairy inspection, what percentage of the authorities on these subjects rank as veterinarians? If one searches the literature for the solid facts upon the bacteriological, microscopic and chemical investigations of the milk supply, how many veterinarians does he find among the authorities of the first rank? If one wishes the best instruction in this field, would he go to a veterinary college—if so, to what one?—or would he go to a school in dairying in connection with an agricultural college?

In meat inspection, the veterinary profession is confronted by one of the most important crises in its history. The Federal government has increased its system of meat inspection until it now costs about $3,000,000 a year. The Federal meat inspection service covers less than one-half of the meat supply of the United States. The larger part of the meat supply is under very little inspection. A few states and municipalities have organized, somewhat tentatively, small meat inspection services. In many places, the authority of the veterinarian in this work is not recognized, and men of little or no training are appointed to occupy positions as meat inspectors. This means that the local meat inspection work will give unsatisfactory results and that it will not develop as it should. The failure of local meat inspection services "to make good," and to develop, will, inevitably, have an effect that is not commonly appreciated upon the Federal meat inspection service.

The cost of the Federal meat inspection service is paid by the individual citizens of the United States; the cost of the state and municipal meat inspection service is paid by the same individual citizens of the United States. To say that one is paid by the National government and the other by the State and municipal governments is to establish a distinction that is not real for, in the end, all taxes, whether general or local, are paid by the people of the country.

Pennsylvania has about one-twelfth of the population of the United States; therefore one-twelfth of the cost of the Federal meat inspection service, $250,000 a year, is paid by the people of Pennsylvania. The people residing in other states pay their share of the cost of the Federal meat inspection service in similar proportion.

How can a given community, or a given individual, be expected to continue indefinitely to pay for the inspection of a part of the meat supply and to ignore the inspection of the remaining part? The individual, the community and the groups of individuals and communities that make up the nation must ultimately depart from such an illogical position and come to the conclusion that meat inspection *is worth having or that it is not worth having.* If it is worth having, then all of the meat must be inspected. If it is not worth having, there is no reason why that part of the supply that is prepared in one State for sale in another shall be inspected and the inspection of the remaining part ignored. This means that local meat inspection services must be developed to take care of the inspection of that part of the supply that is not inspected by the agents of the Federal government or, if this is not worth while, then it is not worth while to continue to spend large sums for the maintenance of the Federal meat inspection service. In other words, municipal, State and Federal meat inspection services must prove their worth and be developed together, or they must fall together. To those of us who believe that meat inspection is of large sanitary importance, there can be no more important task than to assist in the development, along proper lines, of local meat inspection services. If such local meat inspection services are placed in incompetent hands and are developed along improper lines, or are not developed at all, then the end of the Federal meat inspection service is ordained.

The Federal government has placed all positions of independent responsibility in the meat inspection service in the hands of veterinarians, but it has engaged for duty in certain parts of the service a large number of men who are not veterinarians, but who are taken from the ranks of practical butchers. To these men it has given the title of MEAT INSPECTOR, in contradistinction to their superiors in office who are known as VETERINARY INSPECTORS. This new classification and nomenclature has led to much confusion on the part of the public. There is in some places a common and natural impression to the effect that the meat inspection work of the government is no longer conducted by veterinarians—for are not the "meat inspectors" laymen? It is not recognized that the officials termed "meat inspectors" are really meat inspectors only in the most limited sense, and that the important technical work of meat inspection is not done by the so-called meat inspectors, but by the veterinary inspectors. In order that the confusion on this point, which is widespread, and which threatens to lead to serious consequences, may be removed, it is important that the official termed "meat inspector" shall be given some other and less confusing title; "assistant to the veterinary inspector," "meat classifier" or "grader of meats."

Localities organizing meat-inspection services cannot be expected to recognize the fine distinction under the present Federal nomenclature, between the office of veterinary inspector and meat inspector and thus the organization of local services on proper lines is hampered.

On the other hand, the veterinary schools must prepare men not only for the most important part of the work of meat inspection—that based on a knowledge of pathology—but for every possible subdivision of the whole meat inspection field.

The subject of dairy inspection is coming rapidly to the fore. There is likely to be in the near future as much (and, very likely, more) development in the line of dairy inspection as in meat inspection. Among veterinarians it is commonly accepted that the sanitary supervision of dairy farms and herds is naturally veterinary work. There is much to be said in favor of this view. Wholesome milk depends, in the first instance, upon the health of the cows that produce it, and upon the sanitation of their surroundings. So far as the health of cattle is concerned, veterinarians are, of course, the natural experts, but in relation to the sanitation of dairy premises there is much difference in opinion and veterinarians are not commonly accepted as the authorities in this field. The training that veterinarians receive in hygiene, their knowledge of the bacteriology of milk and of the sanitary sciences, ought to make them as conclusively authorities in dairy farm sanitation as they are with regard to the health of dairy cattle. But that this is not recognized is shown by the fact that under the recently developed plan for the sanitary inspection of the farms and herds producing milk for New York City (this inspection is to cost $160,000 a year), there is no special provision for the employment of veterinarians and, unless the plan has recently been materially revised, very few veterinarians will be employed in this work. These inspectors are to be practical dairymen and men trained in dairy schools.

This important and rapidly developing field can be occupied by veterinarians only when it can be shown that men are thoroughly trained in veterinary schools in work of this character, and when it can be shown that the training in this line that is given in veterinary schools is more complete and furnishes a technical equipment of higher quality than may be elsewhere obtained. In other words, if the veterinary profession is to be given this work to do, the schools must greatly strengthen their courses in dairy farm sanitation and in milk hygiene.

Much might be said as to the outlook for veterinary work in many lines related to "animal husbandry." There is much to be done in the development of the animal husbandry of the United States that involves veterinary knowledge but, in order that men trained as veterinarians may be given an opportunity to exercise their veterinary knowledge in this field, it is a prerequisite that they shall have as complete training along animal husbandry lines as is furnished in the best agricultural colleges.

It is a trite saying that "a stream can rise no higher than its source," and unquestionably this is true in relation to the professions. No profession can rise higher than the schools in which its members are trained, as these are the sources of the special knowledge, the grasp and the ideals of the profession.

So long as men must go to institutions other than veterinary colleges to obtain the best attainable training in many of the fundamental subjects that enter into the veterinary sciences, the veterinary profession cannot be said to have a very secure hold on its field, and it cannot advance as it should. Moreover, it is in constant danger of losing part of the ground that it has already occupied. If the veterinary profession is to rank with other learned professions, the average of intelligence and of professional knowledge must be as high as the average intelligence and professional knowledge in the other professions. This means that the schools must be as good as the schools of medicine, law, engineering and agriculture.

We must have good facilities for teaching men, unless we are to be satisfied with a lower standard for our profession than the standard that prevails in other professions. Such facilities cannot be provided without means. The amount of money that is required to equip and maintain a veterinary school on a basis equivalent to that of other professional and technical schools has already been indicated. The next question is how may this money be obtained? It is manifest that it cannot be obtained from tuition fees. A veterinary college maintained wholly by the fees of its students may do excellent work so far as it goes, but its field will ultimately be limited by what the students can afford to pay for. It has been found by experience that schools of medicine, law, engineering and agriculture, etc., and the general scientific and classical courses of the colleges and the universities of the country cannot be sustained by tuition fees alone. Higher education cannot be self-supporting. The college of medicine, for example, that is subsisted entirely by students' fees cannot do its duty to its students. It cannot adequately train men for the responsibilities of the present-day physician.

I have in mind a medical college that is carefully and economically administered, that has 500 students, each paying an annual tuition fee of $200. This college receives the services of a large number of capable men at a minimum salary, in addition to specialists who devote all of their time to the college, and who are well paid. But the tuition fees fail to equal the current expenses of the college by from $25,000 to $35,000 a year.

Colleges of agriculture in the various States receive public funds for current expenses amounting to from $40,000 to $200,000 a year.

In the past, and to some extent now, unendowed veterinary colleges have given to their students much more than the students have paid for, through the public-spirited, generous contributions of time and effort by the teachers; but this sort of self-sacrifice cannot be expected to continue indefinitely. In the long run the efficiency of a school will be in more or less direct proportion to the income of the school.

Institutions of higher education in the United States derive their income, in excess of tuition fees, from three sources: from gifts from individuals, from the public funds of the States in which they are located, and from the Federal treasury. Thus far, veterinary schools have not appealed very successfully to benevolent individuals. One veterinary college in an eastern state has received contributions from individuals amounting to about $250,000. A newly-planned veterinary college in a central state is said to have received a donation of from $200,000 to $300,000 from a group of individuals interested in the live-stock and packing industries. Not much more than one-half million dollars in all has, thus far, been received, or promised, to veterinary colleges from private sources.

A number of States have taken some part in the development and promotion of veterinary knowledge by making appropriations for the equipment and maintenance of veterinary schools. The state of Pennsylvania, during the past two years, has appropriated $200,000 for the construction of a building for a veterinary school. The state of New York has appropriated $150,000 for the construction of a building for a veterinary school. The state of Ohio has appropriated $60,000 for a similar purpose, and a few other states have appropriated smaller amounts. The state of New York appropriates $30,000 annually for the support of the State Veterinary College. The state of Illinois has made a similar appropriation for this purpose. In addition to these, the states of Iowa, Washington and Colorado make small annual appropriations for the support of veterinary education. Some other States support a certain amount of veterinary work in their land-grant colleges, the funds for which come in part from the States themselves and in part from the Federal government.

The Federal government has done nothing directly for veterinary education. As has been stated, small appropriations of the Federal funds donated to land-grant colleges have in some instances been used to support a limited amount of veterinary work. Such veterinary work, however, has, in most cases, been carried on in connection with agricultural experiment stations, or in courses arranged for agricultural students and cannot, therefore, be regarded as of moment in relation to the education of veterinarians.

It is now seriously proposed to appropriate Federal public funds for the support of branch agricultural colleges and agricultural and industrial academies or high schools in the various States of the Union. This project, while it is young, has acquired considerable headway and is being strongly supported.

The development of veterinary knowledge is of such immense importance to the United States that the veterinary profession is fully justified in asking Congress to include it in this scheme and to appropriate money for the support of veterinary schools. The losses from the disease of animals that ought to be prevented, and that we may reasonably expect to prevent in the future, amount to from $150,000,000 to $200,000,000 a year. Less than one percentum of this annual loss would be ample to support all the veterinary schools needed in the United States.

Appropriations by Congress for this purpose should be so bestowed as to render the largest possible service to the country. To make an appropriation of $10,000 or $20,000 to each State would be equivalent to fostering the establishment of a large number of inadequately equipped, insufficiently maintained veterinary schools, which would cheapen and injure the profession and retard proper development.

What we need in the United States is a sufficient number of schools of high class and not an excessive number of schools of low class.

In order that there may be some assurance that Federal funds appropriated for this purpose would do the most good, it should be stipulated that anything given by the Federal government for this purpose shall be matched by an equal sum from other sources, that is, from the State in which the school is located, or from benevolent individuals. If, therefore, a school were able to raise $30,000 or $40,000 a year from local sources, and if it should receive a similar amount from the Federal government, it would then be in position to do the kind of work that the veterinary profession so urgently needs.

In view of the needs of the country and of the tremendous value of veterinary education to all of the people, in view of the precedent that has been established for the use of Federal funds for purposes similar to this (agriculture) and of the overflowing wealth of the National Treasury, it ought to be possible, by concerted effort, to obtain help from that source.

Excepting in the case of a few institutions that are dishonest and that flagrantly violate the code of ethics, and that will be dealt with by the Association of Faculties, it is idle to talk of the inefficiency of the veterinary schools as they exist to-day. Most of them are as efficient as it is possible for them to be under existing circumstances.

The veterinary profession cannot reach the position of usefulness, importance and dignity that it should occupy until largely increased funds for educational purposes are supplied from some sources outside of the profession, and the most likely source is all of the people of the United States as represented by the FEDERAL GOVERNMENT.

WHAT THE SEVERAL STATES ARE DOING FOR THE FURTHERANCE OF VETERINARY INTELLIGENCE AND EDUCATION.

By D. ARTHUR HUGHES, PH.D., D.V.M. (CORNELL),
Inspector, Subsistence Dept., U. S. Army, Chicago, Ill.

America has always had, and now has, an unshaken faith in intellectual enlightenment of the people through a public education which allows any person, native born or foreign born, to rise, if he will, on each step of the ladder, from the rudiments of any subject capable of being taught to the highest university training. The agricultural interests and the veterinary interests are one. Hence, a national system of agricultural education having been adopted as part of the education for the general public, to be furthered by the individual States under Federal aid, whether by popular methods or scholastic methods, it follows that State veterinary education will be an outgrowth of State agricultural education. As agricultural education advances in the several

States, the need for State veterinary education becomes more obvious. The history of agricultural education in this country, from the Morrill Land Grant Act of 1862, to the present time, bears me out in this statement. As agricultural enlightenment increases, particularly intelligence on animal industry, veterinary knowledge and service becomes more appreciated and State veterinary education follows.

Profoundly impressed as I am with these truths, I take it that it is within my province, as a committeeman, to report to the Association recent veterinary facts and intelligence on what the States are doing severally for veterinary enlightenment.

My purpose is threefold: to determine what is being done at present by each State and Territory, whether by scholastic methods or popular methods, for veterinary intelligence and education; to note any tendencies looking towards the establishment of curricula in a separate State veterinary college, in a new college connected with the State university, in the agricultural college, or otherwise, for the purpose of training veterinarians for work within the State; and finally, my purpose is to offer any suggestions which presented themselves for action on the part of this Association.

In order to obtain data, circular letters were sent out, one to the President of each agricultural college or other institution in the United States having courses in agriculture; one to the Director of each agricultural experiment station in the United States.

Letter to presidents:

DEAR SIR:

As a member of the Committee on Intelligence and Education of the American Veterinary Medical Association I am to make a report on the subject, "What the Several States are Doing for the Furtherance of Veterinary Intelligence and Education." Will you kindly refer this letter to the teacher or investigator in veterinary science or animal industry, in order that information may reach me in the form of a letter, printed announcement of courses, bulletins, college or university catalogues, covering the following points:

1. Courses of instruction in veterinary science or animal industry, length of course, degree if any.
2. Number of teachers or investigators in the field of veterinary science or animal industry.
3. College or university extension work for the furtherance of veterinary knowledge in the state.

4. Veterinary sanitary work in the state done through the agency of your college.
5. Work along scientific lines related to veterinary science done by your college in the state.
6. Copies of bulletins, leaflets or reprints of articles on veterinary subjects printed during the last three years.

Letter to directors:

DEAR SIR:

As a member of the Committee on Intelligence and Education of the American Veterinary Medical Association I am to make a report on the subject, "What the Several States are Doing for the Futherance of Veterinary Intelligence and Education." Will you kindly refer this letter to the Experiment Station Veterinarian, Animal Husbandman, or investigator of animal diseases, in order that he may forward to me information, in the form of a letter, together with experiment station bulletins and other printed documents, covering the following:

1. Number of persons in the experiment station engaged in scientific investigation, the writing of bulletins, etc., on veterinary science, animal industry or related subjects, their official titles, duties and work.
2. Subjects or titles of bulletins, or other printed matter, on veterinary subjects printed by your station during the last three years. Please send copies of these papers to me.
3. Investigations in which the experiment station veterinarian or investigator of animal diseases is at present at work.
4. Does your station publish an annual report of its work? Does it contain accounts of work done in the popularization of veterinary knowledge by your station? If so, kindly send copies of the annual reports for the last three years.

The total number of letters sent out was 141. Responses in some form were received from 119, requiring 15 to be written to a second time, 6 a third time, 1 four times. In all 78 letters were received. Responses for information were received in the following forms: Simply a letter, simply printed documents, letter with documents.

In all 209 documents were received,—experiment station bulletins, press reports, annual reports, college catalogues, sanitary laws, magazine articles, etc.

The plan for the arrangement of the information obtained is as follows:

A.—State institutions in which veterinary teaching, investigations, etc., are conducted.

1. Name of state.
2. The institutions.

3. Address.
4. President or director.

B.—Veterinary teaching, investigations, sanitary work, extention work, publications, etc., done under State auspices.

1. Veterinary teaching: courses offered leading to a degree; courses offered *not* leading to a degree.
2. Veterinary investigations: investigations completed; investigations in progress or contemplated.
3. Veterinary sanitary work: state veterinary sanitary work required by law to be done by state institutions; sanitary work done gratuitously by state institutions.
4. Extension work: formers institute work; articles in daily papers on timely topics for farmers.
5. Veterinary publications: bulletins; press reports; annual reports.
6. Buildings and equipment for veterinary work: present equipment; prospective or actual appropriations for buildings.
7. Special work by state veterinary officers: diagnoses for State Boards of Health; co-operative work with the United States Government; miscellaneous.

C.—Officers by whom such work for the states is done:

1. Names of officers.
2. Degrees.
3. Official titles.

ALABAMA.

Institutions in which veterinary teaching etc., is conducted: Alabama Polytechnic Institute and Experiment Station, Auburn, Ala. Director, J. F. Duggar. Dr. C. C. Thach, President of the college.

Veterinary Teaching.—Course offered *not* leading to a degree. Two lectures a week in veterinary science for Junior and Senior agricultural students. Course offered leading to a degree started 1907. A three-year graded course is given, degree D.V.M. To matriculate in this course the person must pass in United States history, geography, English grammar, arithmetic, composition. Candidates for the degree must be 21 years old.

Veterinary Investigations.—Investigations completed: "Sore Head or Contagious Epithelioma in Chickens," 1906; "Cotton Seed Meal Poisoning," 1906; "Mammary Diseases and Bacteriology of Milk," 1906; "Investigations for the Production of Immunity Against Texas Fever."

Veterinary Sanitary Work.—Advice by correspondence: "All inquiries concerning veterinary subjects, whether surgical, medical or sanitary, receive either a written reply or personal attention." Veterinary pathological determinations are made, agglutination tests for glanders are made, mallein and tuberculin are prepared and administered, numerous poultry diseases are investigated, parasitic infestations determined. In 1907, the state of Alabama passed a law establishing a state live stock sanitary board and the office of state veterinarian. Under the law the Secretary of the board and state veterinarian is the Professor of Veterinary Science at the Alabama Polytechnic Institute. Regulations of the State Board have been made. The administration of the law requires the Professor of Veterinary Science to travel much, to control and to prevent disease (see *Amer. Vet. Review,* 1906).

Extension Work.—The Professor of Veterinary Science, or his assistants, occasionally lecture on pertinent subjects before farmers' institutes in any corner of the state.

Veterinary Publications.—Bulletins, etc.: "Chicken Pox or Sore Head in Poultry," C. A. Cary, 1906; "The Physiology and Histology of Normal Pig's Blood," Ward Giltner, 1907, *Jour. Comp. Path. and Therapeu.* Press Reports: "Blackleg in Cattle," C. A. Cary, 1905; "Sore Mouth in Cattle," Sept., 1905; "Infectious Cerebritis," 1905, C. A. Cary. Reports: These, containing all published bulletins of the year, are issued for free distribution.

Buildings and Equipment.—Ample space is given in the agricultural college building for the teaching of veterinary science. The college has a well equipped veterinary hospital in which a free clinic is held Saturdays, and hundreds of cases are treated annually.

Names of Officers.—C. A. Cary, D.V.M.; Ward Giltner, D.V.M. Official titles: of Dr. Cary, Professor of Veterinary Science and State Veterinarian, Secretary of the L.S.S.B.; of Dr. Giltner, Instructor in Veterinary Science and Assistant State Veterinarian.

Other Alabama agricultural institutions:

Tuskegee Normal and Industrial Institute (colored), Tuskegee, Ala. Director Geo. W. Carver writes me: "We have no veterinary department connected with our institution, and do only that kind of work necessary to keep our animals in health."

Agricultural and Mechanical College of Alabama (colored), Normal, Ala. The catalogue says that in the agricultural course of the college "veterinary hygiene" and "animal and vegetable pathology" are taught to sophomore and junior students. But, as in the sophomore class there are only five men, and in the freshman class one man, this primitive teaching need not concern us.

ARIZONA.

Territorial institutions which should be doing veterinary teaching, investigation, etc.: The University of Arizona and territorial experiment station, Tucson, Ariz. President, K. C. Babcock, Ph.D.; Director, R. H. Forbes.

The Director writes me: "We have no veterinarian in connection with the experiment station, although we have a department of animal industry, concerned principally with methods of feeding and sheep breeding." The territorial University has no veterinary department. Frederick W. Wilson, who signs himself "animal husbandman," says he "has that (veterinary) work in charge, but does not, or at least has not done, any work along that line as yet." The seventeenth annual report of the experiment station of the territory of Arizona shows that the only experimental work done connected with animals was to determine the merits of *alfalfa* in sheep feeding and to test certain sheep strains to bring about "a good breed for Arizona."

ARKANSAS.

State institutions in which veterinary teaching, investigations, etc., are conducted: The University of Arkansas and State Agricultural Experiment Station, Fayetteville, Ark.; Univ. of Ark., J. N. Tillman; Director of Experiment Station, W. G. Vincenheller.

Veterinary Teaching.—No veterinary degree granted. Veterinary science is compulsory in the agricultural courses. The four-year course in agriculture calls for veterinary anatomy and physiology in the junior year, pathology and medicine in the senior year. In the two year agricultural course instruction is given in veterinary science throughout two terms of the senior year. Lectures on veterinary subjects, especially the contagious diseases, are also given in the "short course," which is a series of lectures of two or three weeks each for the benefit of farmers.

Veterinary Investigations.—Those completed: "Feeding Cotton Seed Meal to Hogs," "The Cattle Tick in Washington and Benton Counties." Investigations in progress: Tick fever investigations; The toxins of cottonseed meal. These are by the bacteriologist and pathologist. Vermifuge and laxative remedies for hogs; Cattle tick eradication. These are by the veterinarian.

Veterinary Sanitary Work.—The veterinarian of the Agricultural College and experiment station veterinarian holds also the post of State Veterinarian, and the live stock sanitation of the state is in his hands. The college has published a bulletin, "Live Stock Sanitation in Arkansas," which contains the veterinary sanitary laws of the state at present in vogue. The laws that at present govern are chiefly against glanders and Texas fever. A bill is now before the legislature which, if passed, will give greater authority to those engaged in the prevention and suppression of contagious diseases in Arkansas. The main work of the pathologist and bacteriologist is to investigate live stock diseases. Part of the work, however, is done by the State Veterinarian.

Extension Work.—The present legislature, 1906–1907, has appropriated moneys for the purpose of holding farmers' institutes in different parts of the state, and the veterinary department will be represented at the meetings.

Veterinary Publications.—Bulletins: "Pig Feeding Experiments with Cotton Seed Meal," R. R. Dinwiddie, 1903; "Cotton Seed Products in Hog Feeding," R. R. Dinwiddie, 1904; "Live Stock Sanitation in Arkansas," R. R. Dinwiddie, 1904; "Glanders of Horses," R. R. Dinwiddie, 1905; "The Cattle Tick in Washington and Benton Counties," W. G. Vincenheller, 1906; "Cattle Tick Eradication in Northwest Arkansas," W. G. Vincenheller, 1907; "Suggestions for the Prevention of Texas Fever," W. G. Vincenheller. Annual reports are published by the station containing copies of all articles written during the year by members of the station force.

Officers by Whom this Work is Done.—R. R. Dinwiddie, M.D., V.S. Official title: Bacteriologist and Pathologist. W. Lenton, Professor of Veterinary Science and State Veterinarian.

CALIFORNIA.

State institutions in which veterinary teaching, investigations, etc., are conducted: The College of Agriculture and state experiment station of the University of California, Berkeley, Cal. President of the University, B. I. Wheeler; Director of the Experiment Station, E. J. Wickson.

Veterinary Teaching.—No degree is give in veterinary science. Instruction in veterinary subjects is given to students in the agricultural college. The courses are for juniors and seniors. A course of three hours throughout the year is given on bacteria and methods of studying them, and a detailed study of pathogenic organisms of importance in human and veterinary medicine is made. Furthermore a general course in veterinary sanitary science, dealing with the infectious diseases of domestic animals, their recognition and control, is offered; also a course in veterinary science presenting facts on the anatomy and physiology of domestic animals with surgical and medical clinics. The spring of 1907 there were 22 students in the course in sanitary science and 32 in the course involving clinics. A new feature of veterinary teaching in California will be inaugurated Wednesday, October 30, to Tuesday, November 26, 1907, when the University of California will take up, "Instruction in Practical Agriculture Upon the University Farm," Davisville. In the short course in animal industry at that time talks will be given to farmers on animal health and disease. The work will be illustrated by actual surgical and medical demonstrations on clinical material.

Veterinary Investigations and Studies.—The veterinarians of the University of California have been virile in the work in the interest of knowledge therein, they have made recently studies of anthrax, blackleg, Texas fever, and contagious abortion. In addition they have made investigations of poultry diseases, including tuberculosis in fowls, and fowl cholera, and of stable disinfection, the results giving these workers an enviable reputation as comparative pathologists. Investigations in progress: "Vaccination as a Preventive of Tuberculosis in Cattle," "Contagious Epithelioma in Fowls."

Veterinary Sanitary Work.—An active campaign of education on the subject of bovine tuberculosis is being waged through such agencies as the agricultural press, farmers institutes and breeders associations. The official sanitary work is in charge of the State Veterinarian, resident at Sacramento, but the veterinarians of the University of California respond to requests of stockmen for assistance in controlling outbreaks of infectious diseases, particularly, of late, anthrax and poultry diseases. They frequently examine pathological specimens for the diagnosis of the various infectious diseases of stock. Tuberculin is made and distributed, the interpretations of temperatures being made by the veterinarians for farmers who wish to make the test under advisement. An innovation was made last fall in that the veterinary department of the college of agriculture made an extensive exhibit of pathological specimens, apparatus, etc., at the State Fair at Sacramento, to stir up interest in the evil of disease among cattle and other stock.

Extension Work.—One of the college veterinarians spends about half his time lecturing at farmers' institutes throughout the state on veterinary subjects. In the college extension work great stress has been placed upon the importance of prevention and preventive veterinary medicine and means for the control of disease. The work has been of great benefit to the poultry as well as the stock raising industries. Infectious diseases of poultry are of considerable economic importance in California.

Veterinary Publications.—Circulars: "Anthrax," 1903, A. R. Ward; "Blackleg," 1903, A. R. Ward; "Texas Fever," 1903, A. R. Ward; "Hog Cholera," 1903, A. R. Ward; "Contagious Abortion in Cows," transcript from Dr. J. Law's work. Bulletins: "Disinfection of Stables," 1906, C. R. Haring; "Poultry Diseases," 1903–4, A. R. Ward; "Tuberculosis in Fowls," 1904, A. R. Ward; "Fowl Cholera," 1904, A. R. Ward. Reports are published containing all bulletins written during the year, including those on veterinary science.

Perhaps the most important feature of the work of the veterinarians of California (State University men) is the fact that Dr. A. R. Ward, the author of most of the veterinary publications, not only is Assistant Professor of Bacteriology but Director of the State Hygienic Laboratory, acting under instruction of Dr. N. K. Foster, Secretary of the State Board of Health. His position is unique among veterinarians of North America, for not only is he head of the veterinary work of the State University, he is also official State Bacteriologist and Diagnostician not only in veterinary but in human medicine. Dr. Ward's elaborate report of the State Hygienic Laboratory for 1905–1906 shows how vast the work is, including bacteriological examination of hundreds of cultures in suspected cases of diphtheria, typhoid fever, tuberculosis and bubonic plague.

Officers by Whom this Work is Done.—A. R. Ward, B.S., Agr., D.V.M., Assistant Professor of Bacteriology and Director of the State Hygienic Laboratory; C. M. Haring, D.V.M., Instructor in Veterinary Science and Bacteriology.

COLORADO.

State institutions in which veterinary teaching, investigations, etc., are conducted: The State Agricultural College and Experiment Station, Fort Collins, Col. President of the College, Dr. B. O. Aylesworth; Director of the Station, L. G. Carpenter.

Veterinary Teaching.—Courses offered not leading to a degree. Veterinary instruction of this kind is given to agricultural, domestic science, and short-course students. This includes lectures and laboratory work in anatomy, physiology, bacteriology and practical clinical work. Veterinary instruction leading to a degree. By action of the Board of Control, Spring, 1907, high school graduates may present themselves for matriculation in a three-year course in veterinary medicine leading to a degree. This course is to be established immediately. The high school requirement is an order of the Board and unqualified. An ample support for the Department is assured from state funds.

Veterinary Investigations.—Completed: "Relation of Bovine to Human Tuberculosis," "Larkspur and other Poisonous Plants." Investigations in progress or contemplated: "Loco Weeds and their Effect on Live Stock." This work is being done by the experiment station in cooperation with the B. A. I., U. S. Dept. of Agriculture. The work has been going on for three years, though nothing has been published, nor will be, until the close of the investigation. Also two other subjects are being investigated: "No-name Disease, an Ailment which Simulates Horse Typhoid or Swamp Fever," and "Swill Sickness in Hogs Adjacent to Our Cities."

Veterinary Sanitary Work.—The college veterinarian is frequently called to various parts of the state to investigate outbreaks of supposedly contagious diseases.

Veterinary Publications.—Bulletins: "Relation of Bovine to Human Tuberculosis," G. H. Glover, 1901; "Larkspur and Other Poisonous Plants," 1906, G. H. Glover. An annual pamphlet is published containing the reports of the State Board of Agriculture, the Agricultural College, and the State Experiment Station.

Officers by Whom this Work is Done.—G. H. Glover, M.S., D.V.M.; Harry M. Kingman, D.V.S.; I. Newsom, B.S., D.V.M. Official titles: of Dr. Glover, Professor of Veterinary Science and Experiment Station Veterinarian; of Dr. Kingman, Professor of Veterinary Science; of Dr. Newsom, Instructor in Veterinary Science.

CONNECTICUT.

As far as I can discover, neither at the agricultural college of the state of Connecticut, nor at either of the experiment stations, is any work of a veterinary character being done. Dr. E. H. Jenkins, Director of the Conn. Agr. Exp. Station, New Haven, writes, "This station has no veterinarian" . . . "We have published nothing regarding it (veterinary science)." Director L. A. Clinton, of Storrs, writes, "We have a veterinarian in connection with this college, but he has not had charge of any research work and has published no bulletins, and is not engaged in any research work at the present time, as far as I know." The state of Connecticut is in utter darkness, when compared with most of the other states, in this respect. Are the flocks and herds of Connecticut so free from disease that the state does not need the services, for veterinary teaching, field work and laboratory work, of a Professor of Veterinary Science at Storrs Agricultural College or investigators at either of the state experiment stations?

DELAWARE.

State institutions in which veterinary teaching, investigations, etc., are being conducted: Delaware College and State Experiment Station, Newark, Del. President of the College, Dr. G. A. Harter; Director of the Experiment Station, Harry Hayward.

Veterinary Teaching.—A department of veterinary medicine was organized March 1, 1907. No attempt will be made at present to establish a course leading to a degree in veterinary medicine; nor, on the other hand, will there the less be an attempt made to create a class of non-graduate practitioners. The work of veterinary instruction is to begin Autumn, 1907, which will consist of such instruction as is needed by agricultural students, viz., lectures on the common complaints of farm animals, the infectious diseases, administration of medicines, the theory of shoeing, the use of tuberculin, mallein, and anthrax vaccines, in fact all aspects of veterinary science of interest to the stock owner and farmer.

Veterinary Investigations.—As special investigation work, under the provisions of the Adams Act, it is contemplated that the veterinarian will investigate anthrax in all its relations to agriculture; also study the preparation of antitoxic and antibacterial sera. In addition an investigation will be made of "Forage-Poisoning."

Veterinary Sanitary Work.—Advice is given the Board of Agriculture on all matters pertaining to diseases of animals. The department prepares Pasteur anthrax vaccines, for the use of farmers, to be tried under veterinary supervision.

Veterinary Publications.—One popular bulletin has already been issued; subject not given.

Officer by Whom this Work is Done.—C. F. Dawson, D.V.M. Official title: Professor of Veterinary Science and Experiment Station Veterinarian.

FLORIDA.

Florida is distinctly a backward state in veterinary matters. Up to last year, 1906, the college of agriculture of the University of Florida and experiment station (both at Lake City) were under one management, and a competent veterinarian was employed who did experimental work and state sanitary work. But at the present time no veterinarian is employed either by the college or station.

Veterinary Teaching.—Properly speaking, none is done. Though the Professor of Agriculture and Horticulture undertakes the task of talking twice a week to agricultural students on veterinary matters. Of course no degree in veterinary science is granted. No extension work in veterinary science is undertaken; no state sanitary work is done; no studies are made in sciences related to veterinary science.

Veterinary Publications.—Publications touching veterinary science have been done the last three years as follows: "How to Feed a Horse," "The Rabid Dog," "Insect Pests of Animals."

Officer by Whom Such Veterinary Work as is Offered is Given.—R. M. Clotier, M.S., Professor of Agriculture and Horticulture. The veterinary papers were written by Dr. C. F. Dawson, now veterinarian of the Delaware experiment station.

GEORGIA.

State institutions involved in veterinary teaching, investigations, etc., Georgia State College of Agriculture, Athens, Ga., Dr. H. C. White, President; Georgia Experiment Station, P. O. Experiment, Ga., R. J. Redding, Director.

Veterinary Teaching.—As far as I can make out there is no veterinary teaching done in the state institutions of Georgia. The report comes to me, "In a general way I beg to say that there is great need for more veterinary education in this state, but there is no organized force to undertake the work properly. . . . The state is just now giving additional aid to the college of agriculture at Athens, and may soon establish a good department of veterinary science there."

Veterinary Investigations.—Georgia having no veterinary teaching makes it all the more necessary that the experiment station undertake two lines of work, the supply of useful information in usable form, and to make inquiries into diseases of animals in the state. Though the state does not have a state veterinarian, nor a Professor of Veterinary Science, nor a graduate veterinarian at the experiment station, it has, in the State Dairyman, a man of enlightened mind who completely appreciates the value of the professional veterinarian and is using all his strength to further the interests of the veterinary profession and of veterinary knowledge in the state. His department is engaged in several lines of experimentation on animal industry, which touch somewhat closely on veterinary matters, or animal nutrition. The department is assisting the Federal Bureau of Animal Industry with some experiments this season (1907) upon the eradication of cattle ticks; the same department has been working for several months upon the subject of tuberculosis in cattle, testing the methods of rearing calves, the use of preventive vaccines, and tests of tuberculin as a curative agent. As a matter of fact all such work should be done by a thoroughly qualified veterinarian. Such a man, working with the present dairyman, might perform wonders for Georgia.

Veterinary Sanitary Work.—The state experiment station has a good many inquiries from farmers and breeders on the diseases of farm animals, asking for advice and treatment, and, a veterinarian not often being on hand, the dairyman has been forced to send out frequently information of the most elementary nature. Bulletins therefore have been printed for this purpose on Texas fever, hog cholera, actinomycosis and thousands of copies have been sent all over the state. Recently the state has employed a permanent bacteriologist, who is interested in animal diseases, though hitherto no laboratory pathological determinations have been made. Georgia not having yet a state veterinarian, the Commissioner of Agriculture has been empowered to employ a veterinarian by the day when needed to control or to suppress contagious diseases. It is hoped that the present legislature (1907) will pass some measures to establish a regular state veterinary department, also an act to control the practice of veterinary medicine in the state. The Georgia Veterinary Medical Association, recently organized, of which the State Dairyman is Secretary, is working enthusiastically towards that end (see the *Amer. Vet. Rev.*, Mch., 1907).

Veterinary Publications.—Bulletins: "Common Ailments of Cattle During Breeding Period," "Cattle Ticks and Texas Fever," "Hog Cholera," "Actinomycosis." Annual reports: The station publishes them, but they have not in the past contained any record of veterinary work. A change may be made in the future in this regard. All the writing here recorded is by C. L. Willoughby, the State Dairyman.

Officers Charged With this Work.—C. L. Willoughby, Dairyman and Animal Husbandman; W. L. Owen, Experiment Station Bacteriologist.

IDAHO.

Institutions where veterinary teaching, investigations, etc., should be conducted: The University of Idaho and Experiment Station, Moscow, Idaho. President of the University, J. A. MacLean; Director of the Experiment Station, H. T. French.

The distant territory of Idaho has no veterinary department in the college or the station. But it is expected that soon a course of lectures on veterinary science will be offered in the college in connection with the regular course in agriculture.

ILLINOIS.

State institutions in which veterinary teaching, investigations, etc., should be conducted: The College of Agriculture and State Experiment Station of the University of Illinois, Urbana, Ill. President of the University, Dr. E. J. James; Director of the Experiment Station, Eugene Davenport.

Veterinary Teaching.—In connection with the frequent press reports that $250,000 has been set aside by the Chicago packers for the establishment of a veterinary college near the stock yards under the management of the University of Illinois, and that the state legislature had voted a fund of $30,000 per annum for the salaries of instructors, it is interesting to note the following facts with regard to veterinary medicine at the same university at present. No course in veterinary medicine is given at present leading to a degree. Work may be chosen, and is chosen by the agricultural students, in veterinary anatomy and physiology, in veterinary materia medica, in the theory and practice of veterinary medicine and surgery. In reality all the courses are meant for agricultural students. The first, on veterinary materia medica, consists of one hour daily work throughout nine months, taught by lectures and text-books. The second course consists of one hour daily work, for four and one-half months, on outlines of anatomy, physiology and diseases of the digestive, respiratory, circulatory, urinary organs, the lymphatic and nervous systems and skin. The third course, likewise continuing daily for four and one-half months, in which time a study is made of the anatomy, physiology and diseases of the bones and joints, foot, eye, generative organs, together with a study of contagious diseases. All the subjects are taught by lectures and text-books aided by special apparatus, skeletons and live animals both in health and disease. Observations are made and practice obtained in the free clinics held at the veterinary infirmary once a week. Post-mortems are conducted. Students assist at operations.

Veterinary Investigations.—No investigations in veterinary science, as far as can be learned from the university publications, or from correspondence, are being conducted. The director of the experiment station writes me, "The subject of veterinary science is taught in the college, but we conduct no investigations of the subject." There is no veterinarian connected with the experiment station, though a consulting veterinarian is employed. Such apathy, in a great stock raising state like Illinois, should receive our indignant protest.

Veterinary Sanitary Work and Extension Work.—Popular lectures on veterinary sanitary work are given at farmers' institutes as occasion offers. The likelihood is that the sanitary work up till recently, having been in the hands of a non-graduate, little strictly honest scientific work was required to be done by his appointees and there was no need, so to speak, to call upon the experiment station for diagnostic work. When a graduate was recently appointed as state veterinarian by Governor Deneen it was to be expected that a revolution would take place in state sanitary work. When the sanitary needs of the state are made subservient to the desires of a political gang nothing better can be expected than that found up to the time of the appointment of Dr. Wright.

Veterinary Publications.—No bulletins have been published by the veterinary department officer charged with the work in veterinary science.

Officer Who Does the Veterinary Work.—Donald McIntosh, V.S. Official title: Professor of Veterinary Science in the College of Agriculture in the University and Consulting Veterinarian to the Experiment Station.

INDIANA.

State institutions in which veterinary teaching, investigations, etc., are conducted: Perdue University and the Experiment Station, Lafayette, Ind. President of the University, Dr. W. E. Stone; Director of the Experiment Station, Arthur Goss.

Veterinary Teaching.—There is no degree given in veterinary science. Juniors in the College of Agriculture are required throughout the year to take four lectures and two hours laboratory a week on veterinary anatomy and physiology. The course treats of gross anatomy, the relation to each other of the different parts of the body and their functions, the course being intended for the breeder and the feeder. The same number of hours lecture and laboratory work is given in the senior year to instruction in veterinary medicine and surgery.

Veterinary Investigations.—Investigations have, in the last two or three years, been completed on the diseases of sheep in Indiana; while an inquiry is being made at present into hog cholera in the state. Besides the department has been working on a vaccine for the prevention of the disease.

Veterinary Sanitary Work.—Numerous bacteriological studies are made at the university of the different outbreaks among animals. A large correspondence is conducted with persons making inquiries about animal diseases and remedies are suggested. The practical sanitary work in the field at present is that for the control of hog cholera, on account of which diseased herds have been visited often during the last year or two and the owners have been advised on the control of the disease by the use of quarantine measures and disinfectants.

Veterinary Publications.—Bulletins: "Diseases of Sheep," 1903, Drs. R. A. Craig and A. W. Bitting; "Examination of Horses for Soundness," 1905, Drs. G. H. Roberts and A. W. Bitting; "Agriculture at Perdue University," 1905, President W. E. Stone; "Characteristics of Some of the Contagious and Infectious Stock Diseases," 1906, Dr. A. W. Bitting. Press reports: "Mange and Texas Itch Among Horses," 1902, Dr. R. A. Craig; "Lumpy Jaw," 1903, Dr. A. W. Bitting; "Sheep Scab Obtained from the Stock Yards," 1903, R. A. Craig; "Hog Cholera," 1905, Dr. R. A. Craig; "Nervous Exhaustion and Debility in Breeding Ewes," 1906; "The Prevention of Transmissible Diseases of Swine," 1906; "Treatment of Stomach Worms of Sheep," 1906; "The Control of Hog Cholera," 1906; "Glanders in Horses," 1906; "Treatment of Lousy Live Stock," all by Dr. R. A. Craig.

Officer in Charge of the Work.—R. A. Craig, D.V.M., State Veterinarian and Professor of Veterinary Science.

IOWA.

State institutions concerned in veterinary teaching, investigation, etc.: Iowa State College of Agriculture and the State Agricultural Experiment Station, Ames, Ia. President of the college, Dr. A. B. Storms; Director of the Experiment Station, C. F. Curtiss.

Veterinary Teaching.—Courses offered not leading to a degree. Certain courses in veterinary histology and physiology may be elected by students of the Division of Agriculture who are working for the agriculture degree, otherwise the whole strength of the Veterinary Faculty is given to the men who are studying exclusively in the Division of Veterinary Medicine. Course leading to a degree: The four-year course leading to the degree Doctor of Veterinary Medicine from Iowa State College has been so frequently discussed in some form or other that the members of the Association are familiar with its value. Hence the only facts that should concern the Committee on Intelligence and Education, in this investigation, in speaking of Iowa, are those which are novel, which have been overlooked, or not sufficiently emphasized. When the course leading to a degree, to take four years, was inaugurated some time ago, the entrance requirements were so ragged and elastic as to incur criticism, in fact there were practically no entrance requirements. The Iowa State College catalogue for 1907–1908 informs us that those who wish to matriculate for the veterinary degree must be graduates of an accredited high school, or present a "Uniform Admission Certificate" showing that their preparation is equivalent to that of an accredited high school, or else pass the entrance examination covering that work. The Dean writes that there is an "increased attendance in face of the advanced entrance requirements and increased length of course of study." If we understand aright, the entrance requirements to the Division of Veterinary Medicine is now the same as that for entrance to any other course in the college. The summary of veterinary graduates of Iowa shows that between 1880 and 1906 there were 145 graduates in veterinary science, 4 in 1906. In addition, at the close of the academic year 1906, there were 9 juniors, 15 sophomores and 22 freshmen in veterinary medicine.

Veterinary Investigations.—The Dean of the Division of Veterinary Medicine is also veterinarian of the Experiment Station. As far as I can discover, no original investigations have yet been undertaken in veterinary medicine at Iowa State College. The catalogue (p. 113) informs us, "a laboratory intended for the purpose of bacteriological and pathological investigations of the diseases of domestic animals has recently been equipped as part of the experiment station." However for the last two or three years there has been no announcement of original work in veterinary science being conducted at the college, nor original results reached. This is precisely where, in my opinion, Iowa is weak at present.

Veterinary Sanitary Work.—No report obtained. The work is done by authorities other than those at the state institutions.

Veterinary Extension Work.—No report.

Veterinary Publications.—None.

Buildings and Equipment.—The correlated sciences required in the veterinary course, zoölogy, botany, chemistry and bacteriology, are adequately provided for in special laboratories in the college buildings. The Veterinary Division occupies the third floor of Agricultural Hall, one of the best buildings in Iowa State College, and the Division has a commodious three-story brick hospital. Very recently, as aforesaid, a laboratory for bacteriological and pathological investigations has been equipped.

Officers by Whom the Above Work is Done, With their Official Titles.—J. H. McNeil, V.M.D., Dean of the Division of Veterinary Medicine, Professor of Veterinary Medicine and Surgery and Veterinarian to the State Experiment Station; W. A. Stuhr, D.V.M., Associate Professor of Histology, Pathology and Therapeutics; L. H. Hurt, D.V.M., Assistant Professor of Physiology and Sanitary Science; R. R. Dykstra, D.V.M., Assistant Professor of Anatomy and Obstetrics; W. R. Harriman, B.Sc., M.D., Professor of Ophthalmology; M. Stalker, M.Sc., V.S., Lecturer, Veterinary Division; I. J. Scott, B.S., Lecturer on Veterinary Jurisprudence; G. Judish, Lecturer on Pharmacy. With these gentlemen are associated the teachers of bacteriology, chemistry, zoölogy, agriculture and animal industry.

KANSAS.

State institutions concerned in veterinary teaching, investigations, etc.: Kansas State Agricultural College and Experiment Station, Manhattan, Kan. President of the college, E. R. Nichols; Director of the Experiment Station, J. T. Willard.

Veterinary Teaching.—Up till two years ago "the students in the agricultural course received in all about twelve weeks work in veterinary science." In 1905 a four years, nine months, veterinary course was established leading to the degree D.V.M. I am informed that five veterinarians are on the veterinary faculty and that an instructor in comparative pathology and bacteriology will be added, Autumn, 1907. Number of students, 81. Grammar school entrance requirements. Three other men not veterinarians do some of the teaching.

Veterinary Sanitary Work.—The head of the veterinary department is *ex-officio* state veterinarian.

Veterinary Investigations.—Little done for two years. The experiment station has been studying molds effecting corn and other fodders and causing disease in stock.

Veterinary Publications.—None.

Buildings.—The state legislature, 1906–1907, appropriated $70,000 for a veterinary building.

Special Work.—Through the influence in part of the State Veterinarian the state legislature, 1907, established a state Board of Veterinary Registration and Examination, effective January 1, 1908.

Officers Concerned in State Veterinary Teaching, etc., With Official Titles.—F. S. Schoenleber, D.V.S., Professor of Veterinary Science, Experiment Station Veterinarian and *ex-officio* State Veterinarian; C. L. Barnes, D.V.M., Assistant Professor of Veterinary Science; L. M. Goss, D.V.M., Instructor in Veterinary Science; B. R. Rogers, D.V.M., Assistant in Veterinary Science.

KENTUCKY.

State institutions concerned in veterinary teaching, investigations, etc.: Agricultural College of Kentucky and State Experiment Station, Lexington, Ky. President of College, J. K. Patterson; Director of Station, M. A. Scovell.

Veterinary Teaching.—Thirty lectures are given annually to agricultural students upon minor and common ailments of farm animals with treatment. The theory and practice of horse shoeing is also discussed. No separate veterinary course is offered. No degree is given in veterinary science. A veterinary course leading to a degree (?) was maintained for several years, this was discontinued ten years ago.

Veterinary Investigations.—None.

Veterinary Sanitary Work.—No official sanitary work done of a veterinary kind, except it be the occasional employment of a man by the Commissioner of Agriculture in case of an outbreak.

Extension Work and Publications.—None.

Officer by Whom this Work is Done.—J. J. Hooper, Assistant Professor of Agriculture and Animal Industry in the Agricultural College.

LOUISIANA.

State institutions in which veterinary teaching, investigations, etc., are conducted: The Louisiana State University and State Experiment Station, Baton Rouge, La. Dr. T. D. Boyd, President of the University; W. R. Dodson, Director of the State Experiment Stations.

Veterinary Teaching.—No course leading to a veterinary degree is given. To the juniors in the agricultural course two subjects are offered: three hours a week, first half year, on anatomy; three hours a week, second half year, on physiology. To the seniors in agriculture three hours a week are offered in pathology, first half year, three hours a week in materia medica and therapeutics, second half year. Lectures in veterinary science are offered to short course students (winter) for ten weeks.

Veterinary Investigations.—The veterinarian of the experiment station and college is one of the most able, enthusiastic and industrious men we have in the United States. A complete report of his work would cover several octavo pages. We must be brief. Investigations completed: Since 1901 studies have been made on charbon, poisoning of cattle by spoiled potatoes (in the same report is incorporated studies of local contagions) on the sheep industry of Louisiana and parasitic ailments, on nodular disease in sheep, further experiments on nodular disease, Texas fever, blackleg, available stock foods in Louisiana. Investigations in progress or contemplated: Through the generosity of Congress in the Adams Act the Louisiana Experiment Station is enabled to employ an assistant veterinarian and bacteriologist, who began work July, 1906. He will devote all of his time to investigation of animal diseases. He is studying outbreaks of charbon, the horse fly and its relations to the outbreaks, vaccines and the cause of the failure of vaccines to convey immunity, the development of the organism of charbon on various kinds of vegetable matter in the field—grasses, weeds, etc., other insects and birds as disseminators. Also he is studying cerebro-spinal meningitis in horses and a new disease in chickens.

Veterinary Sanitary Work.—Louisiana has been the leader in the South in insisting with others upon the importance of state and national control of animal contagions. In November, 1905, the leaders of the stations in Louisiana and Tennessee met to organize a movement for tick eradication. The virile veterinarian of the Louisiana State University was a delegate to represent this movement before Congress. The present tick extermination movement, in which the Southern States and the national government are united, owes its incipiency to Louisiana and Tennessee. The veterinarian of the Louisiana State University gives only part of his time to teaching, the rest to investigation, to a voluminous correspondence with farmers and stockmen on diseases in the state, and to such gratuitous work for the public, by travel to the places where outbreaks occur, for the purpose of control and prevention.

Extension Work.—Many public lectures in the rural communities on contagions and minor diseases are given.

Veterinary Publications.—Bulletins: "Charbon," 1900; "A Symposium on Various Animal Infections," 1901; "Sheep, their Diseases, etc.," 1904; "Experiments With Nodular Disease," 1904; "Results of Experiments With Nodular Disease," 1905; "Texas Fever," 1905; "Blackleg," 1906; "Nodular Disease," 1906. Annual reports of the activity of the veterinary department are published yearly in the agricultural department papers.

Buildings and Equipments.—An excellent contagious diseases laboratory has just been equipped. Plans have been drawn for the construction of a hospital for diseased animals.

Special Work by the Veterinary Officer.—The veterinarian of the State University of Louisiana has, in an unusual degree, the gift of public speech and written expression. Accordingly he is always ready to use his voice or his pen for the propagation of veterinary knowledge in the state, or elsewhese. He originated "The Demeter," which is the literary organ of the agricultural students of the State University. He is a frequent contributor to such stock journals as *The Breeders Gazette,* and such prominent newspapers as *The New Orleans Picayune* in popular expression on professional topics. Only recently, at the request of the Louisiana State Board of Health, he delivered an address on, "The Importance of Meat and Dairy Inspection." Would that we had a thousand men like him in America.

State Officials and Official Titles.—W. H. Dalrymple, M.R.C.V.S., Veterinarian of Louisiana State University and Experiment Station Veterinarian; H. J. Milks, D.V.M., Assistant Veterinarian and Bacteriologist.

MAINE.

The University of Maine and State Experiment Station, which are concerned in state veterinary teaching, etc., are at Orono, Me. Dr. G. E. Fellows is President; Dr. C. D. Wood is Director.

Veterinary Teaching.—No degree in veterinary science is given. In the College of Agriculture a course for seniors or others is offered of two hours a week, second half year, four and one-half months, in veterinary science, a combined lecture and laboratory course dealing with anatomy and pathology of domestic animals. Every alternate year an additional veterinary course of two hours, four and one-half months, is offered; lectures, demonstrations and clinics, illustrated by models, natural preparations and living animals. In the second half year, four and one-half months, lectures are given to the men in the two-year course in agriculture. Collateral courses in histology and bacteriology may be elected.

Veterinary Investigations.—The Director of the Experiment Station informs me, "This station is doing practically nothing in the line of investigating the diseases of animals." The last list of bulletins shows that nothing in the line of veterinary science has been published for over seven years. Certain studies in tuberculosis have been made, but no definite results have been reached.

Veterinary Officer.—F. L. Russell, B.S., V.S., Professor of Veterinary Science, Consulting Veterinarian to the Experiment Station.

MARYLAND.

Veterinary teaching, investigations, etc., are conducted in the following state institutions: The Maryland Agricultural College and Experiment Station, P. O. College Park, Maryland. R. W. Silvester, President of the College; H. J. Patterson, Director of the Experiment Station.

Veterinary Teaching.—No degree in veterinary science is given. The time of the veterinarian of the agricultural college is given, for three months, January, February and March, to teaching. In this time courses are offered on microscopy, histology, comparative anatomy and physiology and "veterinary elements," for students in the four-year agricultural course. An equivalent amount of work is given to the "short course" men (two year agricultural men) who receive no degree in agriculture.

Veterinary Investigations.—Nominally the veterinary department has existed for several years, but actually only since July, 1906, hence no serious veterinary investigations have been undertaken. Investigations in progress: "Leuco-encephalitis in the Horse" and "Tuberculosis Immunization by the Von Behring Method." In collaboration with the assistant chemist (appointed April, 1907), and animal husbandman, studies are being made in the physiology, pathology and chemistry of milk, and studies of fat and casein in milk.

Veterinary Sanitary Work.—The college and station veterinarian is consulting veterinarian to the State Board of Health and meets with them once a month. A state commission to study leuco-encephalitis in horses is composed of three physicians, one layman and the station veterinarian. The work is exclusively in the charge of the veterinarian and report will be made January 1, 1908.

Extension Work.—Occasional lectures at points in the state.

Veterinary Publications.—None. Three allied studies have appeared in bulletin form, which were originally undertaken after consultation with the veterinarian. "The Influence of Preservatives on the Food Value of Milk," 1902, C. F. Doane and F. M. Price; "The Character of Milk During the Period of Heat (Œstrum)," 1904, C. F. Doane; "Leucocytes in Milk and Their Significance," 1905, C. F. Doane.

The veterinary department is undergoing a period of adjustment. The plan is to have shortly an assistant state veterinarian to take charge of the teaching and all field work; an assistant chemist to do the analytical work indicated by the veterinarian, who himself will have immediate direction of experimental work.

Officer in Charge of this Work.—S. S. Buckley, D.V.S., Professor of Veterinary Science and Experiment Station Veterinarian, Consulting Veterinarian to the State Board of Health.

MASSACHUSETTS.

Massachusetts Agriculture College and Experiment Station, Amherst, Mass., are the state institutions concerned in veterinary teaching, etc. K. L. Butterfield, President of the College; W. P. Brooks, Director of the Experiment Station.

Veterinary Teaching.—No degree in veterinary science is given. A course of four hours a week, for nine months, is offered seniors in the four-year agricultural course, covering, by either lectures or laboratory work or clinics, veterinary hygiene, anatomy, pathology, materia medica, therapeutics, medicine, general and special surgery. A general bacteriological course, twelve hours laboratory work a week for nine weeks, is also given by the Professor of Veterinary Science.

Veterinary Investigations.—Determinations in case of specimens sent in. Study of diseases new to nature. No specific information was sent to me.

Veterinary Sanitary Work.—This is done by the Cattle Bureau of the State Board of Agriculture, Boston. Letters in answer to inquiries about disease are sent out to correspondents.

Extension Work.—Occasional popular lectures on veterinary subjects are given as requested.

Publications.—No specific information was sent to me on this subject. The meagre statement was made, "Publication of bulletins."

Officer Charged With this Veterinary Work.—J. B. Paige, D.V.S., Professor of Veterinary Science.

MICHIGAN.

State institutions in which veterinary teaching, investigations, etc., are conducted: The Michigan State Agricultural College and State Experiment Station, P. O. Agricultural College, Mich. Dr. J. L. Snyder, President of the College; C. D. Smith, Director of the Experiment Station.

Veterinary Teaching.—No doctor's degree in veterinary medicine is given. After taking the Bachelor's Degree in Agriculture a student may employ the larger portion of his time for one year in veterinary science and receive the degree M.Sc. Veterinary studies not leading to a degree: Seniors in agriculture may elect one lecture throughout the year in veterinary science (sixty lectures, Fall, anatomy and physiology; fifty lectures, Winter, materia medica, lameness, diseases of the digestive organs; fifty lectures, Spring, contagious and other diseases). To the sophomores a course of thirty lectures, seven weeks, Fall, are given on common diseases of animals, care and prevention. To the two year "short course" agricultural students forty lectures are given each year on veterinary science. A free clinic furnishes practical illustrations for the benefit of these classes.

Veterinary Investigations.—No investigations have been completed and made a matter of record during the last three years. The bacteriologist and assistant bacteriologist are studying hog cholera and bacterial diseases of sheep. The veterinarian is investigating "Grand Traverse Disease of Cattle," so-called.

Veterinary Sanitary Work.—The college has no direct authority in state sanitary work. This is vested in the Live Stock Sanitary Commission. The veterinarian, as consulting veterinarian of the experiment station, answers numerous inquiries from farmers on diseases amongst domesticated animals. Michigan is exempt from many of the contagious disorders from which many of the states suffer. Contagious swine disorders exist in small sections. Parasitic diseases in sheep are found and a certain chronic incurable indigestion, the cause of which has not yet been determined.

Extension Work.—During 1905–1906 there were 72 two-day or county farmers' institutes, and 225 one-day institutes held. Nearly every county of the state was thus helped by the college. The veterinarian gave many talks at these institutes.

Veterinary Publications.—None printed for over three years.

Officers Concerned in this Work.—G. A. Waterman, M.D.C., Professor of Veterinary Science and Consulting Veterinarian to the Experiment Station; C. E. Marshall, Ph.D., Professor of Bacteriology and Hygiene, Bacteriologist to the Experiment Station. Dr. Marshall devotes most of his time to the diseases of animals from a bacteriological standpoint.

MINNESOTA.

Institutions concerned in veterinary teaching, investigations, etc.: The University of Minnesota and the State Experiment Station, St. Anthony Park, Minn. Dr. C. Northrop, President of the University; Professor W. M. Liggett, Director of the Experiment Station.

Veterinary Teaching.—The University of Minnesota has no veterinary college and gives only veterinary instruction suitable for students in the agricultural college who expect to be stockmen. Three veterinarians give instruction in the university on veterinary subjects. Of these two are employed by the university and one is bacteriologist for the L.S.S.B.

Veterinary Investigations.—In recent years two pieces of investigation have been reported on, hemorrhagic septicemia and stable ventilation. Investigations in progress: Stable ventilation, mainly physiological laboratory, research work dealing with the blood and urine—this being an effort to define the harm, if any, done by insufficient ventilation; to locate such injurious results in the animal body; to establish some sort of a basis for measuring or estimating such effects and to determine the least amount of ventilation compatable with normal health, comfort, profitable milking and feeding. Another piece of work under way is a test of the virulence of the feces of tuberculin-reacting cattle. In addition, a graduate veterinarian, detailed as pathologist from the B.A.I., United States Department of Agriculture, is working in the building of the experiment station on "Swamp Fever."

Veterinary Sanitary Work.—In Minnesota this is under the control of the Live Stock Sanitary Board, of which the Professor of Veterinary Medicine of the State University is a member. The line has been drawn closely in the state between the work of the experiment station and that of the L.S.S.B., the authorities considering the research work belongs to the experiment station and the police work to the sanitary board. The Professor of Veterinary Medicine in the university and the veterinarian in charge of the veterinary division of the experiment station (the same man) helped to organize the original police control work of the state and has always taken a very active interest in the work, but not directly as university or station work. One veterinarian of the L.S.S.B., as field veterinarian, devotes all of his time to police control work. Another veterinarian, as bacteriologist of the L.S.S.B., devotes most of his time to diagnostic work, travelling to points where outbreaks, which are supposed to be contagious, occur, to collect material for diagnosis. The diagnosis is finally made by him in laboratory bacteriological tests. The Professor of Veterinary Medicine in the State University is, or was, the

Secretary of the L.S.S.B., as well as head of the Veterinary Division of the Experiment Station. He therefore has had much to do in the advisement of the work for sanitation in the state.

Extension Work.—None reported.

Veterinary Publications.—"Hog Cholera and Swine Plague," *Exp. Stat. Press Bulletin,* 1905, M. H. Reynolds. Practically all of the following are from the hand of Professor Reynolds: "Tuberculin Test Data," mimeograph bulletin for data sent out in 1905: "Bovine Tuberculosis," 1896; "Technical Data on Bovine Tuberculosis," 1896; "Azoturia," 1896; "Corn Stalk Disease," mimeograph bulletin, 1903; "Actinomycosis," mimeograph bulletin, 1903; "Hemorrhagic Septicemia," bulletin, 1903; "Stable Ventilation," bulletin, 1906; "Horse Mange," "Blackleg," "Infectious Abortion," all mimeograph bulletins; "Sheep Scab."

Veterinary Officers Engaged in this Work.—M. H. Reynolds, M.D., V.M., Professor of Veterinary Medicine in the State University, Head of the Veterinary Division in the State Experiment Station, Member of the L.S.S.B.; C. C. Lipp, V.S., Assistant Veterinarian in the Experiment Station; S. H. Ward, D.V.M., Field Veterinarian of the L.S.S.B.; W. L. Beebe, D.V.M., Bacteriologist of the L.S.S.B.; C. Flocken, D.V.M., Bacteriologist, Path. Div., B.A.I., Investigator of "Swamp Fever."

MISSISSIPPI.

Veterinary teaching, investigations, etc., are conducted at the Mississippi Agricultural College and Experiment Station, P. O. Agricultural College, Miss. Dr. J. C. Hardy, President of the College; W. L. Hutchinson, Director of the Experiment Station.

Veterinary Teaching.—No degree in veterinary medicine is granted. There are courses offered each year to students in the school of agriculture the object of which is to teach them the means for the prevention and care in case of diseases of animals. These are for freshmen, three hours a week, Spring, three months, "How to Care for Sick Animals," lectures and recitations; sophomores, three hours a week, three months, Winter, "Veterinary Science, the Common Diseases of Farm Animals;" juniors, three months, five hours a week, "Sanitary Science and Preventive Measures." All this is required of all agriculture students. Veterinary clinics are held two hours a week, nine months.

Veterinary Investigations.—In the last five years two sets of investigations have been made on Texas fever, one on anthrax, one on blackleg. The experiment station veterinarian is investigating the constantly occuring diseases of animals, especially Southern cattle fever and blackleg.

Veterinary Sanitary Work.—The Professor of Veterinary Science is the only state officer who makes a study of the diseases of animals, the prevention and control of such diseases. A large advisary correspondence is undertaken. The professor travels to do such state sanitary work. But such sanitary work in Mississippi is not official. A bill has been before the legislature for the last six years; but the efforts for the creaton of a live stock sanitary board have, thus far, been fruitless.

Extension Work.—The college has conducted farmers' institutes for ten years, 75 per cent. of the speaking having been done by the college men. Between 1906–1907 over 150 institutes were held with 30,000 students. A farmers' institute paper is published annually containing all the articles necessary to instruct the farmers on disease. Circulars are sent out from time to time as occasion demands. The veterinarian has a large share in this work.

Veterinary Publications.—"Texas Fever," 1901; "Anthrax," 1902; "Tick Fever," 1902; "Blackleg," 1906. All of these were by Dr. J. C. Robert.

Veterinary Officer.—J. C. Robert, B.S., M.D., V.M.D., Professor of Veterinary Science and Experiment Station Veterinarian.

MISSOURI.

The University of Missouri and State Experiment Station are the state institutions concerned in veterinary teaching, investigations, etc. Address, Columbia. Dr. R. H. Jesse, President of the University; H. J. Waters, Director of the Experiment Station.

Veterinary Teaching.—Though no course leading to a degree is given, the University of Missouri requires a large amount of veterinary science in the school of agriculture, that is of those taking a four years' course and expecting to take a degree in agriculture. The sophomores must take, first half year, four and one-half months, one lecture a week and five hours a week laboratory on veterinary anatomy; also, second half year, four and one-half months, devote a similar amount of time to veterinary physiology. The juniors must take three hours a week, four and one-half months, for a course including lectures on veterinary medicine, diagnosis and treatment, and simple surgical exercises. To the juniors, who wish to continue veterinary medicine, three hours a week, four one-half months, are offered on non-infectious diseases, and three hours a week, four and one-half months, on contagious diseases. To the seniors is offered a course of three hours a week on veterinary surgery and obstetrics. Graduates may be asked to assist in experiment station work. An elementary course, three hours a week, eight weeks, is offered to short Winter course men in veterinary hygiene. Few universities in the land devote so much time to veterinary teaching. Collateral medical studies may be taken.

Veterinary Investigations.—The experiment station veterinarian, who is Professor of Veterinary Science in the University, investigates diseases of animals, their origin and cause. No report has recently come to me. But it is well known that the Professor of Veterinary Science is one of the leading investigators of Texas fever in the country.

Veterinary Sanitary Work.—This is in charge of the State Veterinarian. The position is separate from the Professorship of Veterinary Science in the University. The office of the State Veterinarian is in the building of the school of agriculture, as is also that of the Professor, so that the Experiment Station Veterinarian and the State Veterinarian cooperate in state sanitary work.

Veterinary Publications.—No report.

State Officers Concerned in this Work.—J. W. Connaway, D.V.S., M.D., Professor of Veterinary and Comparative Medicine and Veterinarian to the Experiment Station. J. B. Tiffany, B.S., D.V.M., Instructor in Veterinary Science; D. F. Lucky, D.V.S., State Veterinarian and State Lecturer on "Sanitary Sanitation."

MONTANA.

State institutions concerned in veterinary teaching, investigations, etc.: The Montana College of Agriculture and State Experiment Station, Bozeman, Mont. J. M. Hamilton, President of the College; J. B. Linfield, Director of the Experiment Station.

The two subjoined letters, the one from the Professor on Animal Industry, the other from the Director of the Experiment Station, bespeak encouraging news from Montana:

Dear Sir: Yours of April 15th (1907) has been referred to me for reply. We do not give very much veterinary science at this institution as yet, but are making arrangements at present to give a very complete course beginning next year (Fall, 1907). The work at present is more along the line of how to care for animals than treating of pathological conditions.

Yours truly, R. W. Clark.

Dear Sir: The Montana experiment station has at present no veterinary science department. This is not because we do not recognize the very great need for this work, but because we have absolutely no place to put a man who could take charge of this work; our office, class room, and laboratory space being very much restricted indeed. We have a department of animal industry, but the only bulletins that we have published have been those dealing with the feeding of animals, and these bulletins, therefore, deal simply with some phases of the economics of feeding animals. Our plan is, with the new building which we expect to put up in the next two years, to add a department of veterinary science.

Very truly yours,

F. B. Linfield.

NEBRASKA.

The University of Nebraska and State Experiment Station, Lincoln, Neb., are the state institutions concerned in veterinary teaching, investigation, etc. E. Benjamin Andrews is President of the University.

Veterinary Teaching.—No degree in veterinary science is given. In the school of agriculture lectures, etc., three hours a week, nine months, on anatomy and physiology of farm animals are given to second year men. Third year men are offered a course, of nine months, three hours a week and one hour practice period, on "veterinary practice."

Veterinary Investigations.—These are said to be under way: "Our work is mostly research, working on experimental lines exclusively."

Officer in Charge of Whatever Work May be Done, With Official Title.—A. T. Peters, D.V.M., Professor of Cattle Pathology, Cattle Pathologist to the Experiment Station.

NEVADA.

State institutions concerned in the teaching of veterinary science, investigations, etc.: The University of Nevada and Experiment Station, Reno, Nev. Dr. J. E. Stubbs, President of the University and Director of the Experiment Station.

Veterinary Teaching.—Veterinary science has just found for itself a new field in Nevada. A department of veterinary science and bacteriology was established in the State University, January 1, 1907, when a promising Eastern veterinarian was installed as Professor and Experiment Station Veterinarian. Instruction in veterinary science will be offered to agricultural students. No veterinary school is contemplated at present, nor the conferring of a veterinary degree. Previous to this establishment, a course of four hours weekly, four and one-half months, was given on veterinary science by the Professor of Agriculture (the recognition of disease and its control), and an elementary course in bacteriology for seniors in agriculture, two hours a week, four and one-half months, by the Professor of Biology.

Veterinary Investigations.—Certain investigations, in outbreaks of hog cholera and "swelled head" in sheep, were attempted by the Professor of Biology, but nothing definite was learned, 1904. It is too early for the veterinary department to state what lines of investigation will be followed.

Veterinary Sanitary Work.—January, 1905, the state legislature passed a bill providing for the appointment of a state veterinarian as well as measures for the control of contagious diseases. This bill passed both houses and is now a law. It is unfortunate that Nevada did not at that time have a Professor of Veterinary Science at the State University and that, at the start, a close official relationship had not been made between the head of the veterinary police work (state veterinarian) and the experiment station veterinarian.

Extension Work.—In 1903 farmers' institute extension work was started by the university. Beginning with September, 1907, this is to be entirely in charge of the school of agriculture. As Nevada is a ranching state the Professor of Veterinary Science is to have his work assigned to him as a farmers' institute lecturer.

Veterinary Publications.—Bulletins: An elaborate investigation of Nevada forage plants has been conducted which has a direct bearing on animal physiology, especially nutrition, which is important in that nearly the only source of animal sustenance in Nevada is the ranges. These are companion studies to those conducted by veterinarians in other states on poisonous forage plants. They are: "Nevada Weeds," 1893; "Feeding Stuffs," 1894; "Field Notes on Nevada Grasses," 1896; "Nevada Weed Seeds," 1897; "Summer Ranges of Western Nevada Sheep," 1901; "Summer Ranges of Eastern Nevada Sheep," 1903; "The Climate of Reno," 1905; "Native Forage Plants," 1906.

Officer in Charge of Veterinary Work.—W. B. Mack, D.V.M., Professor of Veterinary Science and Experiment Station Veterinarian.

The above papers were written by the chemist, botanist, animal husbandman and bacteriologist.

NEW HAMPSHIRE.

State institutions in which veterinary teaching, investigations, etc., are conducted. The New Hampshire Agricultural College and Agricultural Experiment Station, Durham, N. H. President and Director of the Experiment Station, W. D. Gibbs.

Veterinary Teaching.—I wish to particularly draw the attention of this Association and of the graduate veterinarians of New Hampshire to the state of things in that state and to denounce those conditions emphatically. No degree is given in veterinary science at the college. But New Hampshire is the only state in enlightened New England to employ a non-graduate to do veterinary teaching. The Associate Professor of Agriculture (a B.S.Agr.) does the work. He is apparently required to teach "Veterinary Elements," four-hour "exercises" a weeek, twelve weeks, Winter, to juniors in the four-year agricultural course and to the two-year agricultural students. This is upon anatomy and physiology, postmortems, simple farm medicines, modes of application . . . common farm operations. He also offers a course on "Animal Diseases" to the same classes of students: three "exercises" a week, twelve weeks, Spring, lectures and recitations upon the common infectious and contagious diseases of farm animals, their causes and methods of treatment. There is no question but that this work should be in the hands of a veterinarian. It is a burning shame that such colleges as this in New Hampshire cannot have a veterinary officer connected with them.

Veterinary Investigations, Sanitary Work, Extension Work, Publications.—Nothing done by the state institutions.

Officer Saddled With What Little Work is Done.—E. L. Shaw, B.S. (Agr.), Associate Professor of Agriculture and Associate Agriculturist to the Experiment Station.

NEW JERSEY.

State institutions concerned in veterinary teaching, investigations, etc.: Rutgers Scientific School and New Jersey Agricultural Experiment Station, New Brunswick, N. J. W. H. S. Demarest, President of the College; E. B. Voorhees, Director of the Experiment Station.

Veterinary Teaching.—None now done. None ever done as far as I can discover by these or other state institutions.

Veterinary Investigations.—None reported since 1899 (eight years). Certain studies in animal diseases were made, between 1893 and 1897, by the Biologist of the Experiment Station: on the use of Koch's lymph in the diagnosis of tuberculosis in cattle; on bovine tuberculosis; on the Koch test; on suppression and prevention of tuberculosis; on germs in milk; on observations of infectious abortion in cattle; on tuberculosis and other studies. For some years this biologist has been working chiefly on the molluska (oyster breeding, etc.).

Veterinary Sanitary Work.—I have not been able to find that the land-grant college of agriculture (or school of science, Rutgers), or the state experiment station, have anything to do officially with state veterinary sanitary work. Director Voorhees informs me that no work of a veterinary character is done at the station. In other words it appears that the state institutions do not co-operate with the State Board of Health either in laboratory work or in field work. If so, New Jersey is a marked contrast to such enlightened states as Pennsylvania and Wisconsin. The work against animal contagions is divided between the State Tuberculosis Commission and the State Board of Health, all sanitary work against other animal contagions except tuberculosis being done by the State Board of Health. However the veterinarian for both the State Board of Health and the State Tuberculosis Commission is the same person, Wm. Herbert Lowe, D.V.S. In case of outbreaks he is empowered to employ veterinary assistants. The Secretary of the State Tuberculosis Commission and of the State Board of Agriculture is Franklin Dye. The Secretary of the State Board of Health is H. Mitchell, M.D.

Extension Work.—Nothing of a veterinary character being done by college or experiment station officials, farmers' institute work is in charge of the State Board of Agriculture.

Veterinary Publications.—None by state veterinary officials have come into my hands. None, as far as I can discover, have been written. The Biologist of the Experiment Station, apparently at the request of the State Tuberculosis Commission, has reported on the following: "Koch's Lymph in Diagnosis of Tuberculosis in Cattle," pp. 285, 1893; "Information on Tuberculosis," pp. 272, 1894; "Experimental Studies of the Koch Test," pp. 246, 1895; "The Suppression and Prevention of Tuberculosis," pp. 285, 1897; "Germs in Milk," pp. 260, 1897; "Observations on Abortion and Tuberculosis," pp. 287, 1899.

Officer by Whom this Work Was Done.—Julius Nelson, Ph.D., Biologist of the Experiment Station.

NEW MEXICO.

Institutions concerned in veterinary teaching, investigations, etc.; The New Mexico College of Agriculture and Agricultural Experiment Station, P. O. Agricultural College, N. M. President and Director of the Experiment Station, Luther Foster.

Veterinary Teaching.—This is of the simplest character. In the four-year course in agriculture the elements of veterinary science are taught in the senior year two hours a week for one term. A free "clinic" is held. One man teaches both animal industry and whatever of veterinary science is offered, though I cannot judge from the letter received whether the work is given by a veterinarian or not.

Veterinary Investigations.—None reported other than that a scheme is being devised whereby the farmers of the community surrounding the agricultural college may co-operate with the station in an experiment "to determine to what extent alfalfa in the ration may cause sterility." Investigations recently have shown that tuberculosis is common in animals in the territory.

Veterinary Publications.—Bulletin 55: "Tuberculosis in Cattle."

Officer Responsible for Whatever Work is Done.—P. D. Southworth.

(I am unable to say from the letter whether this man is a veterinarian or not.—D. A. H.)

NORTH CAROLINA.

State institutions in which veterinary teaching, investigations, etc., are conducted: North Carolina Agricultural Experiment Station and Agricultural College, West Raleigh. Dr. G. T. Winston, President of the College; R. W. Kilgore, Director of the Experiment Station.

Veterinary Teaching.—No veterinary degree granted. The agricultural juniors are required to take four hours a week, three months, on veterinary anatomy (lectures with illustrative dissections); four hours a week, three months, on veterinary medicine (materia medica and sanitary science); four hours a week, three months, lectures on the diseases and injuries, with clinics. The seniors in agriculture may elect: three hours a week, nine months, on veterinary medicine and surgery. To Winter-course students are offered twenty-four lectures in veterinary hygiene and the diseases of live stock.

Veterinary Investigations.—None reported.

Veterinary Sanitary Science.—The Professor of Veterinary Science at the college is also State Veterinarian. His work on the eradication of the Texas fever tick in North Carolina is too well known by the Association to delay us here. The State Veterinarian was one of the first to demonstrate the feasibility and the profitableness of tick eradication. The state is working in close harmony with the national government for tick eradication.

Veterinary Publications.—No report. However, the State Veterinarian has published several bulletins on tick eradication and circulars showing the methods he uses and the progress of the work.

Officers Charged With State Veterinary Work With Official Titles.—Tait Butler, V.S., Professor of Veterinary Science and Zoölogy, State Veterinarian; G. A. Roberts, B.S., D.V.S., Assistant Professor of Zoölogy and Physiology.

NORTH DAKOTA.

State institutions in which veterinary teaching, investigations, etc., are conducted: The North Dakota Agricultural College and Experiment Station, Fargo. Dr. J. H. Worst, President of the College and Director of the Experiment Station.

Veterinary Teaching.—Few state colleges or experiment stations have such a hold on the commonwealth as has North Dakota through veterinary teaching, investigation and sanitary law. A degree is not conferred in veterinary science. Nevertheless, since January, 1903, when he was appointed, the present incumbent of the veterinary chair has given his subject great prominence in the public mind and in the college community. He has taught veterinary science to the students of the various courses in agriculture, therapeutics to the pharmacy class and hygiene to the juniors in the preparatory course. The college, among other things, gives a three-year course in agriculture, of twenty-two weeks each year, Fall and Winter. For the twenty-two weeks of the first year, daily, a course in anatomy and physiology of the domestic animals is required, the idea of which is to prepare the farm boy for advanced veterinary work and for stock breeding, judging and feeding. For twenty-two weeks, second year, three-year course, daily, animal hygiene is taught, embracing many subjects coming under sanitation and zoötechnics for ten weeks, followed by twelve weeks on contagious and non-contagious diseases. The four-year students in agriculture take one hour a day instruction in veterinary science for nine months, with clinics (required). The course consists of simple talks on anatomy and physiology followed by lectures on pathology. The men who come to college for a simple one Winter course in agriculture receive lectures on veterinary science daily. In the junior preparatory course (boys not yet in the college course) lectures in the spring term, three months, daily, are given in veterinary hygiene. The seniors in the pharmacy course receive lectures on therapeutics, daily, three months, twelve weeks. In addition laboratory course in bacteriology is offered to graduate veterinarians and in animal pathology. To supplement all this work demonstrations are made in the free clinics held each Saturday morning.

Veterinary Investigations.—Since 1904 investigations, in the state, have been made of Abortion in Cattle, Scours in New Born Calves, Scabies in Sheep and Cattle and Mange in Horses, the Negri Bodies in the Diagnosis of Rabies in Cattle, Swamp Fever in Horses and of Bovine Tuberculosis.

Veterinary Sanitary Work.—The state has an excellent body of laws relating to the control of animal diseases, with elaborate regulations based on the laws and rulings thereon. The Professor of Veterinary Science of the State Agricultural College is Chief State Veterinarian. The state is divided into twelve veterinary districts, each having a district veterinarian responsible, under the Chief State Veterinarian, for the administration of the sanitary law, and each receives $600 per annum. The Chief Veterinarian and his aids have the right of entrance to premises, seizure and destruction in case of general epidemics among animals. Besides there are special sanitary laws on glanders, sheep inspection and dipping in case of communicable parasitic disease. Special appropriations are made under the law for stationery for the correspondence of the Chief State Veterinarian so that his professional advice on sanitation can be given. To the state board laboratory at Fargo large amounts of material are sent for identification and diagnosis. The report to the Governor, covering 1906, details sanitary work done on scabies in cattle, mange in horses, scabies in sheep, against the ravages of sclerastomum armatum, blackleg, rabies, glanders and farcy, tuberculosis.

Veterinary Publications.—Bulletins: "Abortion in Cattle, Scours in Calves," L. Van Es, 1902; "Scabies in Sheep and Mange in Horses," L. Van Es, 1904; "Swamp Fever in Horses," L. Van Es, 1907. Reports (part of) seventh annual report of the North Dakota Agricultural College to the Governor, 1904. Annual report of the Chief State Veterinarian, 1906. The sixteenth annual report of North Dakota Agricultural Experiment Station, 1906. The seventeenth annual report of the North Dakota Agricultural Experiment Station, 1907.

Veterinary Officer Who Has this Work in Charge.—L. Van Es, M.D., V.S., Professor of Veterinary Science in the State Agricultural College; Experiment Station Veterinarian, and Chief State Veterinarian.

OHIO.

State institutions charged with veterinary teaching, investigations, etc.: The College of Veterinary Medicine and the College of Agriculture of the Ohio State University, Columbus. President of the University, Dr. W. O. Thompson; Dean of the College of Veterinary Medicine, Dr. D. S. White; Dean of the Agricultural College, H. C. Price.

Veterinary Teaching.—The three years' course in veterinary medicine at Ohio State University leading to the degree, D.V.M., having been sufficiently reported on during the last two or three years by the Committee on Intelligence and Education, I pass to other veterinary teaching done by the College of Veterinary Medicine of that University. Special courses in veterinary medicine are offered to the students of the four years' course in agriculture and to the students of the special Winter course in agriculture (dairying). The students of the second year of the two years' course in agriculture and those of the third year of the four years' course in agriculture are required to take: Fall term, twelve weeks, six hours a week, recitations and demonstrations in veterinary anatomy. The same students take five hours, Winter term, twelve weeks, five hours a week, "veterinary practice," non-infectious diseases, minor surgery; also, Spring term, twelve weeks, five hours a week, recitations and practical work, contagious diseases, treatment and prevention. The students in the special Winter course in dairying are required to take three lectures a week, twelve weeks, on diseases of the cow. These courses serve as another means to impart intelligence on veterinary matters among the agricultural communities of the state.

Veterinary Investigations.—The Ohio State Experiment Station at Wooster does no investigating in veterinary science, nor has it done any for seven years. The investigations in animal diseases are made and bulletins are issued by the State Board of Live Stock Commissioners in close co-operation with the men of the College of Veterinary Medicine of the State University.

Veterinary Sanitary Work.—Ohio has had ample legislation governing state sanitary work and state investigations of contagions. A workable body of state live stock commissioners is established, consisting of two members, a secretary and state veterinarian, empowered with the formation of sanitary regulations and administration of the law. Ample provision is made for the payment of these men, for the appointment of an assistant state veterinarian and employment of veterinarians by the day in case of outbreaks. In recent years the work of administering the sanitary laws, of suggesting new legislation for the control of disease, in the writing of bulletins, press reports and letters to impart information on animal disease, and the general supervision of police work has been in the hands of a dutious and highly intelligent graduate of Ohio State University, who has kept in close touch with that centre of veterinary intelligence. The annual reports of the Live Stock Sanitary Board contain simple maps indicating the places where contagions are present, while in the text means are pointed out for their control. In the year closing, 1906, 1500 cases of mycotic stomatitis in cattle were diagnosed in one county, the disease having been mistaken for foot and mouth disease. Many cases of rabies among dogs, pigs and cattle were reported indicating the need of a law for its suppression. An attempt was made in Dayton by the Board to exterminate glanders, 600 horses having been subjected to the mallein test and 83 having been condemned. The Board has also had to deal with anthrax, actinomycosis, coital exanthema, foot-rot in sheep, infectious keratitis in cattle, nodular disease in sheep, scabies and mange in the different animals.

Veterinary Publications.—These, by the Board of Live Stock Commissioners, have been, not so much the results of laboratory work, as accounts of contagions in the state and methods of control. No papers were sent to me, nor a list of publications.

Officers by Whom Such Work is Done.—The Faculty of Veterinary Medicine: D. S. White, D.V.M., Dean and Professor of Veterinary Medicine; A. M. Bleile, M.D., Professor of Anatomy and Physiology; S. Sisson, S.B., V.S., Professor of Comparative Anatomy, Secretary; O. V. Blumley, V.S., Associate Professor of Veterinary Medicine; C. B. Morrey, B.A., M.D., Professor of Bacteriology; D. H. Udall, D.V.M., Associate Professor of Surgery and Obstetrics; J. M. Phillips, M.D., Associate Professor of Veterinary Medicine. A. D. Fitzgerald, B.Sc., D.V.M., Assistant Professor of Comparative Anatomy and Pathology. These gentlemen are assisted by the professors of dairying, chemistry, animal industry, zoölogy and entomology. The S.B.L.S.C.: T. L. Calvert, Secretary; Paul Fischer, D.V.M., State Veterinarian; M. B. Lamb, D.V.M., Assistant State Veterinarian.

OKLAHOMA.

Territorial institutions concerned in veterinary teaching, investigations, etc.: Oklahoma Agricultural College and Experiment Station, Stillwater, Okla. A. C. Scott, President of the College; John Fields, Director of the Experiment Station.

Veterinary Teaching.—Veterinary science is taught to all agricultural students during part of their course both to four year men and to the short-course agricultural students. No degree in veterinary science is conferred.

Veterinary Investigations.—A number of investigations, important to the Territory, have been completed during the last three years: Bacteriological Studies of the Water Supply of Oklahoma and Soil Inoculation, Tests of the Disinfecting and Parasitic Power of Certain Coal Tar Dips and a Study of Tuberculosis in Hogs.

Veterinary Sanitary Work.—Neither the college nor the experiment station have official connection with the Live Stock State Commission, hence the college veterinarian is not under its dictation. However the veterinarian co-operates with the L.S.S.C. in case of outbreaks of animal diseases. Under the "Contagious Diseases and Quarantine" law of the Territory the members of the L.S.S.C., three in number, are ostensibly appointed for their political faith and veterinary knowledge and the Live Stock Inspectors and their deputies in the three territorial districts for the same reasons. However thus far the law has proven workable and has been strictly carried out in recent work for tick eradication. Oklahoma has also a law, passed 1899, to prevent the spread of hog cholera and other contagious diseases and to prevent traffic in animals dying from infectious diseases.

Extension Work.—No organized work has been done.

Veterinary Publications.—"Directions for Using Vaccine for the Prevention of Blackleg in Cattle," L. L. Lewis, 1903; "The Water Supply," L. L. Lewis, 1904; "Disinfecting Power of Coal Tar Dips," L. L. Lewis and J. F. Nicholson, 1904; "Tuberculosis in Hogs," L. L. Lewis, 1904; "Soil Inoculation," L. L. Lewis and J. F. Nicholson, 1905; "Tests of Dips as Lice Killers," L. L. Lewis, 1906.

Veterinary Officer by Whom this Work is Done.—L. L. Lewis, D.V.M., Professor of Veterinary Science and Experiment Station Veterinarian.

OREGON.

State institutions in which veterinary teaching, investigations, etc., should be conducted: Oregon Agricultural College and Experiment Station, Corvallis. Dr. F. M. Gatch, President of the College; James Withycombe, Director of the Experiment Station.

Veterinary Teaching.—No veterinary degree is conferred. Only one course is required in veterinary science—that given to the senior four-year agricultural students. This is five hours a week, Spring term, twelve weeks, the Anatomy of the Horse, Causes and Symptoms of Disease in the Domestic Animals. The course is given by the Professor of Agriculture. Collateral studies: vertebrate zoölogy, morphology and physiology of vertebrates, introduction to the study of veterinary science, required of agricultural juniors, seven hours a week, twelve weeks, Winter; bacteriology, senior agriculture elective, laboratory principles, seven hours a week, twelve weeks, Fall term; also pathogenic germ diseases, of stock and poultry, twelve weeks, seven hours a week, Spring term. Electives are also offered to seniors on histology and embryology.

Veterinary Investigations.—None reported. No investigations are made and no veterinary work has been done other than routine work in the study of outbreaks of diseases by laboratory methods.

Veterinary Sanitary Work and Extension Work.—Sanitary work and extension work are apparently in their beginnings in Oregon. The college has of late been taking an active part in farmers institutes and promises for these lectures on "veterinary science." This work will consist of a general discussion of the causes of the common diseases of cattle, their treatment and the best means of prevention.

Veterinary Publications.—None.

Officers Concerned in this Work.—James Withycombe, Professor of Agriculture; A B. Cordley, M.S., Professor of Zoölogy; E. T. Pernot, M.S., Professor of Bacteriology.

PENNSYLVANIA.

Letters to the Pennsylvania State College and Experiment Station brought the intelligence: that no work whatever of a veterinary character is undertaken at the state college or at the experiment station. Whatever state veterinary work is accomplished is done through the agency of the Veterinary Department of the University of Pennsylvania and the State Live Stock Sanitary Board. Dr. Pearson is Dean of the Veterinary Department and Secretary of the S.L.S.S.B. Address: Logan Hall, Thirty-sixth Street below Woodland Avenue, Philadelphia, Penna.

Veterinary Teaching.—As, in Pennsylvania, the teaching of agriculture and the teaching of veterinary medicine are divorced from one another—agriculture being taught towards the western part of the State at the state agricultural college, veterinary medicine only in Philadelphia on the eastern limit, the opportunities to influence, academically, agricultural students in favor of veterinary science is less than in other states where a veterinary course leading to a degree is given, where numerous agricultural students are in residence, and where the professors of agriculture and the professors of veterinary science unite to train the veterinarians. However, what is true in Philadelphia is also true in most of the veterinary colleges of the old world, which have produced scores of veterinarians preëminently fitted to work in agricultural communities. The veterinary teaching of Pennsylvania is confined to a three-year course in veterinary science leading to the degree of Doctor of Veterinary Medicine from the University of Pennsylvania. This course has been enough reported on by the Committee on Intelligence and Education before. The course in itself is admirable, improved though it might be. However the status of veterinary students in the University of Pennsylvania and of veterinarians in the state of Pennsylvania, will never be what it should be until the matriculation requirements in veterinary medicine are equal to those in the Department of (human) Medicine in the same University, and until the veterinary course is made equivalent to that in human medicine as it is in Great Britain and as it will shortly be made in the state of New York. Now, veterinary students at Pennsylvania cannot enter the Department of (human) Medicine until "they have passed examination for matriculation in the Department of (human) Medicine in force at the time they enter the Department of Medicine" (see college catalogue).

Veterinary Investigations.—These, for the state, are in charge of the L.S.S.B. The Board has a state laboratory for the investigation of disease, at the head of which is the Bacteriologist of the L.S.S.B. of Pennsylvania, M. P. Ravenel, M.D. The State Veterinarian, seconded by such men as Drs. Ravenel, Gilliland, Deubler, Reichel, and Barnett, of the state laboratory, has done much to set in motion investigations in bovine tuberculosis and rabies. The laboratory of the Pennsylvania State Live Stock Sanitary Board was the first, 1900–1901, in this country to diagnose rabies by examination of the peripheral ganglia of the cerebro-spinal and sympathetic systems, and was the first in this country to work upon a plan to prevent tuberculosis of cattle by vaccination. It developed an original system different from that of Von Behring. The Pennsylvania laboratory is still at work on this question.

Veterinary Sanitary Work.—State veterinary sanitary work began in earnest in 1895 by the establishment, by the legislature, of the L.S.S.B., Dr. Pearson of the University of Pennsylvania being made Secretary and State Veterinarian. His work for the control of bovine tuberculosis in Pennsylvania is too well known to need repetition here. The "Regulations Governing the Driving or Shipping of Dairy Cows and Cattle for Breeding Purposes into Pennsylvania" (bovine tuberculosis control work) of June 6, 1901, being based on the "Act to Protect the Health of the Domestic Animals of the Commonwealth of Pennsylvania," of 1897. In 1907 two acts of the legislature of Pennsylvania further increasing the prerogatives of the L.S.S.B. were passed, one establishing a Pennsylvania Meat Inspection Service, carrying $68,000 for expenses, the other a stallion service inspection bill with $3,500 to carry out its purposes. Dr. Carl W. Gay has been appointed to enforce the provisions of this law. The state L.S.S.B. received also this year $135,000 on the general appropriation bill and $29,000 for additional land for the state farm where experiments are being carried out.

Veterinary Publications.—These are few, but important. Bulletins: Pennsylvania Department of Agriculture, bulletin No. 75, "Tuberculosis of Cattle and the Pennsylvania Plan for its Repression," L. Pearson, B.S., V.M.D., and M. P. Ravenel, M.D., 1901; Pennsylvania Department, bulletin No. 79, "Rabies," M. P. Ravenel, M.D., 1901; an annual report each year and several papers published in technical journals.

Buildings and Equipment.—Pennsylvania has recently been particularly fortunate in the obtainment of buildings and equipment for state veterinary teaching and sanitary work. The trustees of the University have purchased 55,000 square feet of land for the veterinary department, an act which helped to stimulate the generosity of friends who gave $150,000 for maintenance and a thoroughly equipped building is being erected for veterinary work. A large part of this building is now in course of construction and will be ready for occupancy in 1907. The legislature of 1907 gave $100,000 for the completion of this building, $100,000 having been given in 1905 by the State for the same purpose. This building when completed, taken with the new laboratories of the

Medical Department, will give unsurpassed facilities for veterinary studies in Philadelphia. The state has also had, for diagnostic and investigating work, the state L.S.S.B. laboratory; and, for experimentation, the state farm.

State Officers.—Leonard Pearson, B.S., V.M.D., M.D. (honoris causa), Dean of the Veterinary Department of the University of Pennsylthe L.S.S.B. The appointment of a Deputy State Veterinarian and ten Veterinarians in the Meat Hygiene Service has been authorized. The Faculty of Veterinary Medicine of the University of Pennsylvania, consists of eight professors, four of whom are veterinarians, and sixteen lecturers, instructors and demonstrators, eight of whom are veterinarians.

RHODE ISLAND.

State institutions in which veterinary teaching, investigations, etc., are conducted: Rhode Island College of Agriculture and State Experiment Station, Kingston, R. I. Howard Edwards, President of the College; H. J. Wheeler, Director of the Experiment Station.

Veterinary Teaching.—Strictly no veterinary teaching is done by the college. Cooper Curtice, D.V.S., M.D., who, up till a few months ago, was Professor of Animal Industry, was wont to give courses on "Farm Animals," chiefly of an industrial character.

Veterinary Investigations.—Rhode Island is not a "live stock" state, but a poultry state. Hence whatever investigations have been made have been on poultry diseases. Dr. Cooper Curtice spent much of his energies on two diseases: Goose Septicemia and "Black Head" or Infectious Entero-Hepatitis in Turkeys. Lately Dr. Curtice has returned to the B.A.I. work in the extermination of the Texas fever tick in the Carolinas and Virginia. Definite results have been reached on goose septicemia, but the investigations on the means of propagation and the carriers of entero-hepatitis is being continued by the present head of the division of animal breeding and pathology of the college.

Veterinary Sanitary Work and Extension Work.—The station makes numerous diagnoses of poultry diseases from specimens sent to the laboratory. Whenever desired, talks on veterinary subjects at granges, farmers institutes, etc., are made.

Veterinary Publications.—Bulletins: "Goose Septicemia," Cooper Curtice, 1903. During the present year it is expected that a bulletin on "Black Head, Entero-Hepatitis in Turkeys," will appear, setting forth some of the results obtained. The work is being continued in co-operation with the Pathological Division of the B.A.I., United States Department of Agriculture, in the hope of eventually rehabilitating the lost turkey industry of Rhode Island. Short accounts of the work are contained in the annual reports of the Experiment Station, 1903–1906.

State Officers, Past and Present, Responsible for Whatever Work of a Veterinary Character that Has Been Done.—Cooper Curtice, D.V.S., M.D., Professor of Animal Industry and Head of the Division of Animal Breeding and Pathology. L. J. Cole, Ph.D., successor to Dr. Curtice in the above position.

SOUTH CAROLINA.

State institutions in veterinary teaching, investigations, etc., are conducted: Clemson College and Agricultural Experiment Station, P. O. Clemson College, S. C. Dr. P. H. Mell, President of the College; J. N. Harper, Director of the Experiment Station.

Veterinary Teaching.—No attempt is made to qualify men for veterinary practice, but instruction is given only in such of the veterinary sciences as are of special importance in animal industry. The college year is divided into terms of three months each. In the Veterinary Division of the Agricultural Department the following subjects are taught: anatomy, two hours, six months, two terms; physiology, three terms, nine months, two hours a week; with laboratory work two terms, six months, two hours a week; general surgical principles, one term, three months, two hours a week; veterinary hygiene and sanitary science, three terms, nine months, three hours a week. Only one degree, B.S., is givn by the college to graduates of all departments.

Veterinary Investigations.—Veterinary investigations or studies completed and reported: "A Wasting Disease of Young Cattle (Verminous Gastritis)," "Calf Scours," "Methods of Eradicating Cattle Ticks." Veterinary investigations in progress or contemplated: "Parturient Paresis in Cattle," on "Certain Diseases in Chickens," on "Verminous Gastritis in Calves and Sheep," on "Nodular Disease in Sheep," "Experiments in Tick Eradication."

Veterinary Sanitary Work.—The Associate Professor of Veterinary Science in the Agricultural College and Veterinarian in the Experiment Station is also State Veterinarian. The Instructor of Veterinary Science in the College is Assistant State Veterinarian. The law of South Carolina, pertaining to animals afflicted with contagious diseases, is called an act to "authorize and empower the Trustees of Clemson College to promulgate and enforce rules and regulations for the guidance of the veterinarian of said college in the treatment and destruction of animals afflicted with contagious diseases." Under the authority vested in the law the said trustees have made a set of "office rules of the state veterinarian" setting forth in a workable manner the duties and the functions of that officer. At the last session of the state legislature a law was passed giving the additional authority necessary to take up tick eradication work. This work will be renewed, and the new authority exercised, at the beginning of the fiscal year, July 1, 1907.

Veterinary Extension Work.—The Associate Professor of Veterinary Science lectures at farmers institutes on themes related to his work.

Veterinary Publications.—Since the incumbency of the present veterinarian to the position of experiment station veterinarian the following bulletins have been published: "A Wasting Disease of Cattle (Verminous Gastritis)," L. A. Klein, 1905; "Calf Scours, a New Method of Treatment," L. A. Klein, 1906; "Methods of Eradicating Cattle Ticks," L. A. Klein, 1907. (Also published as Circular No. 110, May 20, 1907, of the Bureau of Animal Industry, United States Department of Agriculture.) The seventeenth, eighteenth and nineteenth annual reports of South

Carolina Agricultural College and Experiment Station, 1905, 1906, 1907, contain reports of the veterinarian.

Officers in Charge of, Veterinary Work, with their Official Titles.—A. S. Shealy, V. S., Associate Professor of Veterinary Science, Veterinarian to the Experiment Station, State Veterinarian, Expert in Texas Fever, Pathological Division, Bureau of Animal Industry, United States Department of Agriculture; Enoch Barnett, V.M.D., Instructor in Veterinary Science and Assistant State Veterinarian.

SOUTH DAKOTA.

State institutions concerned in veterinary teaching, investigations, etc.: The South Dakota College of Agriculture and Experiment Station, Brookings, S. D. Dr. R. L. Slagle, President of the College; J. M. Wilson, Director of the Experiment Station.

Veterinary Teaching.—None reported. The annual report of the college for 1906, including lists of students, shows that there were no students in veterinary science for the year 1906.

Veterinary Investigations or Studies.—Studies for the benefit of farmers have been made on Flies Affecting Live Stock, on the Treatment of Nail Pricks in the Horse, on the Fringed Tape Worm in Sheep. Investigations are being conducted in co-operation with the United States Department of Agriculture on Dipping Sheep Affected with Scabies. A $2,000 building for the purpose of studying the diseases of live stock has recently been voted by the legislature.

Veterinary Sanitary Work.—No response to questions.

Veterinary Publications.—Bulletins: "The Treatment of Nail Pricks in Horses Feet," E. L. Moore, 1906. Press bulletin: "Tape Worms in Sheep," E. L. Moore, 1906.

Officer in Charge of Work Undertaken by the State.—E. L. Moore, B.S., D.V.S., Professor of Zoölogy and Veterinary Medicine and Experiment Station Veterinarian.

TENNESSEE.

State institutions concerned in veterinary work: the University of Tennessee and State Experiment Station, Knoxville, Tenn. Dr. Brown Ayres, President of the University; H. A. Morgan, Director of the Experiment Station.

Veterinary Teaching.—No veterinary degree is conferred. The juniors in the four-year course in agriculture are required to take three hours a week, nine months, lectures and practical work, in comparative anatomy, physiology, sanitary science, bacteriology, horse shoeing and zoötechnics. The second year men in the two-year course are required to take three lectures on veterinary science each week for twelve weeks. In the two weeks dairy husbandry course twelve lectures on veterinary science are given, especially on diseases of the cow.

Veterinary Investigations.—The Director of the experiment station, who is also State Entomologist, has made certain studies of the Texas fever cattle tick, its nature and habits, methods of eradication, which have had much to do with the present tick eradication movement throughout the South. Recently he has worked with the newly appointed experiment station veterinarian on alsike clover and its effects on horses and mules.

Veterinary Sanitary Work.—Veterinary sanitary work in Tennessee is far from what it should be. It is done almost entirely by the State Department of Agriculture under the immediate supervision of the Live Stock Sanitary Commissioner who is not a veterinarian. Fortunately, largely through the energies of Director Morgan, the state of Tennessee, with Louisiana, was a leader in the movement for tick eradication. The Tennessee agricultural authorities and the Federal authorities are working towards that end.

Veterinary Publications.—Bulletins: "Texas Fever Cattle Ticks: Pasture Methods of Eradication," H. A. Morgan, 1905; "Alsike Clover: Ill Effects Sometimes Produced on Horses and Mules Pastured Exclusively Upon Alsike," H. A. Morgan and M. Jacob, 1905; "Cattle Tick Extermination," H. A. Morgan, 1906.

Officers by Whom this Work Was or is Done.—M. Jacobs, V.M.D., Instructor in Veterinary Science, Veterinarian and Animal Husbandman to the Experiment Station; H. A. Morgan, B.S.A., Professor of Zoölogy and Entomology, Director of the Experiment Station and State Entomologist.

TEXAS.

The Texas Agricultural College and Experiment Station at College Station, Tex., are the state institutions in which veterinary teaching, investigations, etc., are conducted. Dr. H. H. Harrington is President of the College; J. A. Craig is Director of the Experiment Station.

Veterinary Teaching.—No veterinary degree is conferred. Only such courses are given, to agricultural students, who are to become farmers or stockmen. All students in agriculture are required to take anatomy and physiology of the domesticated animals, sophomore year, Winter, twelve weeks, three hours a week with two and one-half hours practice weekly additional. The four-year agricultural students, working for the B.S., who choose "Group C," animal industry, for the major portion of the junior and senior years work, are required to take: veterinary pharmacology, junior year, Fall, twelve weeks, two hours a week, two and one-half hours practice a week additional; contagious diseases, junior, Fall, twelve weeks, two hours a week practice; diseases of the domestic animals, junior, Winter, twelve weeks, three hours a week, five hours a week additional of practice; parasites and parasitic diseases, junior, Spring, twelve weeks, two hours a week, practice hours additional; obstetrics, juniors, Spring, two hours a week, twelve weeks, two and one-half hours a week additional. The seniors take veterinary laboratory, Winter, twelve weeks, two and one-half hours a week, with practice, or they take a special course in pathology. The men taking a short two-year course in agriculture are required to take veterinary anatomy and physiology for twelve weeks, three hours a week, Winter, first year, and may elect any of the above courses in the second year.

Veterinary Investigations.—No veterinary investigations have been given permanent record since 1902, at which time, and before, came from the Texas experiment station the excellent work on the Immunization of Cattle Against Texas Fever. Work on Texas fever has been continued at the Texas station since 1902. An investigation is also being conducted on the Stomach Worms of Cattle.

Veterinary Sanitary Work.—This is not, I believe, in the hands directly of the State Agricultural College.

Veterinary Publications.—None since 1902.

Buildings and Equipments.—The veterinary laboratory and class rooms are among the best of their kind in the country. The legislature of Texas, which adjourned in the spring of 1907, appropriated $5,000 for a veterinary hospital for the Agricultural College.

Officers in Charge of this Veterinary Work for the State.—Mark Francis, D.V.M., Professor of Veterinary Science and Veterinarian to the Experiment Station; R. P. Marsteller, D.V.M., Instructor in Veterinary Science.

UTAH.

The Agricultural College and Experiment Station of Utah, Logan, are the institutions which are concerned in veterinary teaching, investigation, etc. Dr. W. J. Kerr is President of the College; P. A. Yoder is Director of the Station.

Veterinary Teaching.—None reported. No response to questions.

Veterinary Investigations.—No investigations on veterinary subjects have yet been completed and recorded in Utah. In July, 1906, for the first time, an experiment station veterinarian was appointed, in the person of H. J. Frederick, D.V.M., Iowa State College, 1905, before that a student of the Brigham Young College and the State Agricultural College. In connection with the B.A.I. he is carrying on investigations in the state of "Big Head in Sheep." Since being appointed he has made an extensive investigation of bovine tuberculosis in Utah and will shortly publish his results.

Veterinary Sanitary Work.—Utah has no state veterinarian. Hence the only recourse people have recently had is to the new experiment station veterinarian. A large correspondence along the line of animal disease has been opened. Numerous requests for the services of the veterinarian have been sent in, many of which had to be refused. The following diseases are found to be present: tuberculosis, contagious abortion, blackleg, glanders, cerebro-spinal meningitis, horse influenza and distemper, hog cholera, mange and actinomycosis. The experiment station veterinarian states that he was called frequently by the State Board of Health in case of animal outbreaks, and suggests that a state veterinarian be appointed, the work of whom should be co-ordinated with that of the experiment station.

Veterinary Publications.—None have as yet appeared.

Officer in Charge of State Work.—H. J. Frederick, D.V.M., Veterinarian to the Experiment Station. The Veterinarian is in charge of investigations in Utah relative to big head in sheep for the B.A.I., United States Department of Agriculture.

VERMONT.

The State Agricultural College and Experiment Station, Burlington, are the state institutions concerned in veterinary teaching. Dr. M. H. Buckham is President of the University; J. L. Hills is Director of the Experiment Station.

Veterinary Teaching.—Veterinary science is a required subject for two years in the four-year course in agriculture, and is an elective in the senior year. No degree is conferred in Veterinary Medicine. The courses are as follows that are required: Comparative anatomy of the domestic animals, lectures, laboratory dissection and recitations, two hours a week, sophomores, four and one-half months; comparative physiology of the domestic animals, lectures, recitations and laboratory, three hours a week, four and one-half months, sophomores; histology, weekly, four and one-half months, juniors, recitations and lectures, two hours weekly, four and one-half months; diseases of the domestic animals, lectures, recitations and clinics, three hours weekly, juniors, four and one-half months. The elective work is: clinical exercises in the veterinary hospital, one hour weekly, seniors, four and one-half months; veterinary anatomy, dissections, three hours weekly, four and one-half months, and two hours weekly, four and one-half months.

Veterinary Investigations.—I am informed that very little investigation work has been, or is being, done in Vermont. The Professor of Veterinary Science, who is consulting veterinarian to the Experiment Station, the Director informs me, has assisted in the writing of only one bulletin during the last seven years. The Director states that the veterinarian has done a little investigation and is likely to do more in the future. The veterinarian is at present engaged upon no investigation.

Veterinary Sanitary Work.—None done through college agency. No university extension work in veterinary science is done.

Veterinary Publications.—Nothing has been printed on veterinary matters for about four years.

Buildings and Equipment.—The experiment station building contains a veterinary clinical laboratory. Back of this building lies the veterinary hospital and dissecting room.

Officer in Charge of Veterinary Work for the State.—F. A. Rich, V.S., M.D., Professor of Veterinary Science and Consulting Veterinarian to the Experiment Station.

VIRGINIA.

State institutions concerned in veterinary teaching, investigations, etc.: Virginia Polytechnic Institute and Experiment Station, Blacksburg, Va. Dr. J. M. McBryde is President of the College; A. M. Soule is Director of the Experiment Station.

Veterinary Teaching.—No veterinary degree is conferred. Extensive work in veterinary science is offered in the four-year course in agriculture, and for those preparing to take the veterinary degree elsewhere, as follows: two hours a week, nine months, veterinary anatomy; veterinary medicine, three hours a week, nine months; general pathology, three months, three hours a week; infectious diseases, two hours a week, three months; common diseases of farm animals, three hours a week, three months. In addition courses are given on animal parasites three hours a week, three months, Fall; materia medica, three hours, four and one-half months; free clinics with lectures on operative surgery, twelve hours a week, two sessions or eighteen months; conformation and soundness, etc., two hours a week, three months, Fall; principles of shoeing, two hours a week, three months, Spring; horse judging, two and one-half hours each week, six months.

Veterinary Investigations.—Studies or investigations have been made of sheep scab, stomach worms of cattle and sheep, the horn fly of cattle, milk fever. Certain investigations are in progress under the guidance of the experiment station.

Veterinary Sanitary Work.—This, for the whole state, is done by the State Veterinarian who is also Associate Professor of Veterinary Science in the College. The state sanitary regulations are formed by this officer, under direction of the Trustees of the college (called in Virginia the Board of Visitors), in a manner similar to that holding in South Carolina.

Veterinary Publications.—"Sheep Scab," 1901; "The Stomach Worm," 1901; "Mange in Horses," 1904; "Milk Fever," 1905. All these were written by Dr. John Spencer.

Buildings and Equipment.—A suite of rooms on the third floor of Agricultural Hall, lecture rooms, office, library, dispensary, bacteriological laboratory, museum, are in the possession of the Veterinary Department, as well as a modern Veterinary Hospital, well equipped.

Officers Concerned in State Work.—John Spencer, V.S., Professor of Veterinary Science; J. G. Ferneyhough, D.V.S., Associate Professor of Veterinary Science and State Veterinarian.

The Hampton Normal and Industrial Institute for Negroes and Indians, Hampton, Va. H. B. Frissell, Superintendent.

Veterinary science is given for one year to undergraduates and one year to post graduates by "a registered veterinarian." No degree. The work is part of the agricultural curriculum. No investigations are made. The Superintendent of Agriculture, E. A. Bishop, sends this information.

WASHINGTON.

State institutions concerned in veterinary teaching, investigations, etc.: The State College of Washington and Agricultural Experiment Station, Pullman, Wash. Dr. E. A. Bryan is President and Director.

Veterinary Teaching.—The teaching in veterinary science done by the Washington State College has been reported on before by the Committee on Intelligence and Education. A recapitulation is as follows: In the "school of veterinary science" a course of three years of nine months each is given in "Veterinary Science" leading to the degree D.V.M. A course of four years of nine months each is given in "the Department of Veterinary Science" leading to the degree B.V.M. The candidate for the Bachelor's degree may at the same time be a candidate for the

Doctor's degree. The degrees conferred are against all university precedent, for Washington makes a Bachelor's degree more important than a Doctor's degree. If Washington wished to give a Bachelor's degree in any case she should have elected to omit giving a Doctor's degree at all—a Bachelor's degree usually being given at the end of a four-year college course. The fact is that the way things are in this country at present a degree in veterinary medicine is hardly equal to an ordinary Bachelor's degree given at the close of a four-year undergraduate course.

Veterinary Investigations.—Studies or investigations completed: "Tuberculosis in Animals and Man," "Glanders," "Forage Poisoning in Sheep." Investigations in progress: "Experiments in Bovine Tuberculosis," "Research in Cerebro-Spinal Meningitis."

State Sanitary Work.—The Professor of Veterinary Science in the State College is State Veterinarian of Washington and Member of the State Board of Health. Through his vigilance recently the state has been cleared of swine plague and hog cholera and glanders has been reduced by one half. A large correspondence is carried on in which veterinary advice is given. Total number of animals examined 1903–1904, 12,550. Many mallein and tuberculin tests were made. Mange, lumpy jaw, hog cholera and blackleg were dealt with. Over 3,900 imported animals were inspected and given bills of health.

Extension Work.—Lectures were given during the last three years at farmers institutes on different phases of veterinary science which appeal to the layman. An attempt has been made to impress the public with the necessity for a pure milk supply.

Veterinary Publications.—"The Horse Industry of the Pacific Northwest," S. B. Nelson, Farmer's bulletin No. 117, United States Department of Agriculture, 1900; "The Relations of Tuberculosis in Domesticated Animals and Man," S. B. Nelson, 1900; "Preliminary Report on Glanders," S. B. Nelson, 1902; "Feeding Wild Plants to Sheep," S. B. Nelson, 1906; "Fifth Annual Report of the State Veterinarian," S. B. Nelson, 1905.

Officers and Official Titles.—S. B. Nelson, D.V.M., Professor of Veterinary Science, Veterinarian to the Experiment Station and State Veterinarian; K. W. Stouder, D.V.M., Assistant Professor of Anatomy and Surgery; W. E. Ralston, D.V.M., Instructor in Veterinary Science; O. Menig, D.V.M., Lecturer on Ophthalmology; W. V. Glaisyer, D.V.M., House Surgeon.

WEST VIRGINIA.

State institutions concerned in veterinary teaching, investigations, etc.: West Virginia University and Agricultural Experiment Station, Morgantown. D. D. B. Purenton, President of the University; J. H. Stewart, Director of the Experiment Station.

Veterinary Teaching.—No response to letters. West Virginia has advertised a veterinary course leading to a degree, but, by correspondence, I could get no information.

Veterinary Investigation.—No investigations relating to veterinary science are being conducted at present. The station is casting about for "a person competent to investigate questions relating to feeding, breeding, and to carry on investigations relating to the diseases of domestic animals." The agriculturist has attempted a simple study of the treatment of sheep for internal parasites.

Veterinary Sanitary Work, Extension Work, Publications.—None.

Source of Information.—J. H. Stewart, Agriculturist of the Experiment Station.

WISCONSIN.

State institutions in which veterinary teaching, investigations, etc., are being conducted: The University of Wisconsin and Wisconsin Agricultural Experiment Station, Madison. C. R. Van Hise, President of the University; W. A. Henry, Director of the Experiment Station.

Veterinary Teaching.—No veterinary degree is given. Wisconsin has few peers in agricultural teaching, in its several branches, in the United States. About 25 lectures on elementary anatomy, physiology and hygiene are given to the second year students of the short (two year) course in agriculture in December and January. The same students, and those of the first year of the same course, are instructed in judging horses and examining for soundness, the course including lectures on breeds and the breeding of horses. The students of both years are taught simple methods of administering medicines, caring for sick animals, applying bandages, dressings, etc. Two lectures a week, four and one-half months, Spring, are given juniors and seniors in the four-year course in agriculture, on elementary histology, anatomy, physiology, pathology and hygiene. The same students receive instruction in breeds, breeding, judging, examination for soundness (horses), practical demonstrations and post-mortem examination, etc., as occasion offers. Five lectures and demonstrations on veterinary matters for farmers in the special ten-day course in February are given. All this work is given by the Professor of Veterinary Science.

Veterinary Investigations.—The chief investigations along veterinary lines undertaken by the station are in charge of the bacteriologists. Special work is being done by the veterinarian on leucocytosis in milk. Clinical examination of blood (cow, pig) is made. The intestinal parasitisms of sheep, the poisonous properties of certain sheep feeds, are being studied. The bacteriological department of the agricultural college is in close touch with the State Live Stock Sanitary Board in matters relating to animal diseases.

Veterinary Sanitary Work.—The veterinarian gives advice by mail to farmers having sick animals to care for and makes many examinations of tissues and diseased animals sent to him for the purpose. He examines public service stallions referred to him as unsound. For many years the veterinarian has been veterinary editor of *The Breeders Gazette,* Chicago, and in this way has given sanitary advice to farmers, not only in his own state, but among all breeders and stockmen. However, diagnosis, in case of outbreaks in Wisconsin, is in charge of the bacteriologist, while sanitary police work is in charge of the State Live Stock Sanitary Board.

Veterinary Extension Work.—In no state has farmers' institute work been carried to greater perfection than in Wisconsin. In the year closing, 1906, one three-day and eighty one-day institutes were held. A farmer's institute bulletin was issued giving stenographic report of the last institute of the year. Of these 35,000 copies were sent to farmers who attended, the rest were put in school district libraries, etc. As time allows and as occasion offers the Professor of Veterinary Science addresses such farmers institutes on matters pertaining to hygiene, breeding, soundness of horses, rudimentary anatomy. This work, on the veterinary side, is to be increased shortly and especially with the view of giving instruction in the breeds of horses, proper breeding methods and on matters pertaining to soundness and the breeding of animals. Similar talks are given at county and state breeders associations.

Veterinary Publications.—Those by the veterinarian are: "The Principles and Practice of Horse Breeding," 1905; "The Horse Breeding Industry of Wisconsin." Those by the bacteriologists are: "Disappearance of Bacteria Artificially Introduced into Cow's Udders," "A Graphic Method of Demonstrating the Action of Acid Producing Bacteria in Cream," "Infectiousness of Milk from Dairy Cows," "Two Ways of Treating Tuberculosis in the Herd," "Influence of Tuberculin Testing on the Milk Secretion," "A Lesson in Bovine Tuberculosis," "Distribution of Tuberculosis in Suspected and Non-Suspected Herds of Wisconsin," "The Spread of Tuberculosis Through Factory Skim Milk." All these were printed between 1903, 1906 and 1907.

Special Work.—Through the efforts of the veterinarian of the college Wisconsin inaugurated stallion licensing in this country. The original bill was prepared by the veterinarian of the University and a special department of horse breeding was established by the Board of Regents of the University and placed in his charge. An amended bill giving this department the right to revoke licenses for cause, and stipulating the diseases that shall constitute hereditary, transmissible and communicable diseases of horses sufficient to warrant rejection for breeding purposes, has passed both houses of the legislature and will forthwith become a law. The list of diseases referred to was drawn up by the Professor of Veterinary Science and has been adopted in the similar stallion laws just enacted in Pennsylvania and Utah. Other states have similar laws pending as a result of the initiatory work done in Wisconsin.

Officers in Charge of this State Work.—A. S. Alexander, M.D.C., F.H.A.S., Professor of Veterinary Science, Veterinarian to the Experiment Station, in charge of the Department of Horse Breeding; E. G. Hastings, M.S., Assistant Professor of Agricultural Bacteriology; H. L. Russell, Professor of Bacteriology; G. C. Humphrey, B.S., Assistant Professor of Animal Industry.

WYOMING.

The University of Wyoming and Experiment Station, Laramie, are the institutions concerned in veterinary teaching, etc. Dr. F. M. Tisdell is President and Director.

Veterinary Teaching.—No degree in veterinary science is conferred. Veterinary elements, the anatomy, physiology, and pathology of domestic animals, are required of agricultural sophomores, three months, Winter, five times a week. An elective course for agricultural seniors is offered, three times a week, Winter, on "Veterinary Medicine and Therapeutics."

Veterinary Investigations, Sanitary Work, Publications.—None. Short articles, chiefly paraphrases of papers by Dr. G. H. Glover and Dr. J. Law, on "Abortion," "Scours in Calves" and "Poisonous Plants," have been issued in the "Ranchman's Reminder," a paper published, I should judge, by the college. These paraphrases were put together by "The Assistant in Animal Industry." The only other articles published dealing at all with animals are bulletins on sheep feeding.

Officer Who Did this Work, Such as It Is.—G. E. Morton, M.L., B.S., Assistant in Animal Industry.

THINGS PROFITABLE FOR THE VETERINARY PROFESSION IN STATE ACTIVITY AT THE PRESENT TIME FOR THE FURTHERANCE OF VETERINARY EDUCATION AND INTELLIGENCE.

Veterinary Teaching.—This naturally divides itself into two parts: the scholastic, or that for students who come to the college; the popular, that done through various agencies for persons up and down the State who do not enter an agricultural institution. The scholastic work, the purpose of which is not in the main to train veterinarians but to help agricultural students to understand veterinary principles, first aid, control work, etc., is given: to winter students in agriculture, farmers, or farm boys, who spend two to six weeks at the college; to agricultural students spendng two years; to agricultural students spending four years at the college. The winter man receives a few lectures; the two-year man takes much veterinary work, usually the second year; the four-year man takes much veterinary work for two years, and usually may elect more. The tendency is, by the addition of teachers, laboratories, hospitals and other equipment, for the State Agricultural College to offer more and more veterinary work in the junior and senior years, or in a post-graduate year. Later, the development is towards a three- or four-year course in veterinary science leading to a degree. Colorado and Alabama are the latest to offer such a course, each to begin 1907. Courses leading to a degree were established in State institutions as follows: Iowa, 1879; Pennsylvania, 1884; Ohio, 1890; New York and Washington, 1896; Kansas, 1905; Colorado and Alabama, 1907. The total number of winter and two-year students in agriculture last year was 3,885, of four-year agricultural students, 2,638. When it is remembered that the most of these were required to take work in veterinary science, it is easy to see how veterinary knowledge spreads, the veterinarian becomes appreciated. Such work builds up public sentiment in favor of a veterinary course leading to a degree in agricultural colleges, State universities or separate State colleges.

Veterinary Investigations.—These, for the State, are usually done by the veterinarian of the agricultural college. The Experiment Stations are usually departments of the Agricultural Colleges. If so, the Veterinarian is Professor of Veterinary Science and Experiment Station Veterinarian, or merely consulting veterinarian to the Experiment Station. In some States the investigations of animal diseases are made by a separate pathologist (Arkansas), or by the bacteriologist of the Station (Michigan), or by a veterinarian aided by chemist and bacteriologist (Maryland). If the work is done by a veterinarian, as it usually is, or under veterinary direction, it usually redounds to the good of the veterinary profession.

Sanitary Work.—The veterinarians of the agricultural colleges, working individually for the Commonwealths or in connection with a State Board of Health or Sanitary Commission, are apt to have a strong hold upon State veterinary sanitary work, usually as State Veterinarians or Assistant State Veterinarians (Alabama, North Carolina, North Dakota, Kansas, Indiana, Virginia, Washington). In some of the Southern States the college, through its veterinarian, has control of live stock sanitation in the State. This brings very heavy burdens upon the State officer, but he gloriously shoulders them. In many States the veterinarian of the agricultural college does a vast correspondence on animal diseases, makes diagnoses or pathological determinations. All these things strengthen veterinary interests and appreciation in the States.

Veterinary Extension Work.—In many States the veterinarians of the agricultural colleges have written short popular reports or discussions of diseases causing havoc among live stock, and have had copies of them scattered broadcast. Farmers' institutes have been organized in each State and Territory under the

Secretary of the Board of Agriculture, or Experiment Station Council (the usual thing), to give farmers the benefit of popular talks by experts. These have aided in the propagation of veterinary intelligence. The veterinarians of the agricultural colleges and experiment stations give lectures at them on the control of diseases, or on simple remedies, or make demonstrations. These assemblies of farmers are now pretty well organized, and many thousands attend the numerous sessions in all corners of the States.

Veterinary Publications.—In the body of my paper I submit lists of the veterinary publications of each State, as far as they could be learned, done during the last few years. The dissemination of information on veterinary matters, whether in pamphlet form, bulletins, press reports or articles for the newspapers, is, to speak veraciously, enormous in quantity. The quantity and quality of the State veterinary publications depends chiefly on the fruitfulness of the minds of the veterinarians and the financial aid given by the States for such ends. The United States reports show that, for the last year alone, six and one-half millions of copies of papers on agricultural topics were sent out by the several States, to a mailing list of 731,000 readers. When we remember that most of the States produced one to three or four veterinary papers, and that many thousands of these papers were sent out, it is easy to see that not the smallest part of the total of six and a half million copies distributed last year were veterinary papers.

State Veterinary Buildings and Equipments.—It would be an interesting thing to collect data on buildings and equipment held by the State Agricultural Colleges, experiment stations and other State institutions for veterinary purposes. The States are in possession of veterinary hospitals, laboratories, lecture rooms, museums and collections sufficient to carry on the veterinary work that they advertise. Though most of us do not know about it, the State legislatures are granting moneys for further equipment. For instance, Texas Agricultural College has just gotten an appropriation of $5,000 for a veterinary hospitál; Kansas Agricultural College has obtained from the State, a few months ago, $70,000 for a veterinary building. Though the munificence of the Legislature to the State veterinary work of Pennsylvania excites our warmest admiration, $200,000 having been voted during the last two years for buildings alone.

To summarize, the States are doing a vast work for the furtherance of veterinary education and intelligence—in the popularization of veterinary knowledge, through the agencies of the press and the lecture platform, through veterinary investigations and sanitary work, most of all, perhaps, in the propagation of veterinary principles in the required work at the agricultural colleges, where the student body, what is to be the most intelligent farm element, is fashioned in a high appreciation of the veterinarian and his work. The duty of each State is to train the veterinarians for work within its own confines. If a State needs men it should train them, not call on other States, or on a veterinary college elsewhere, to send it men. A number of the more enlightened States already have started this work, others are within a step of a full veterinary college course, others are advancing towards that end. Let the States educate their own veterinarians. Let the State institutions, however constituted, and the State officers who train the veterinarians, be responsible to the State government for the adequate equipment of the veterinarians for their life work. Let each State round out its veterinary ideals for itself, stimulated and guarded by the leading minds represented in this, the American Veterinary Medical Association, now and as time goes on.

CERTAIN CONDITIONS IN THE STATES AT THE PRESENT TIME DETRIMENTAL TO THE VETERINARY PROFESSION OR UNPROFITABLE FOR IT.

1. The attention of the Association is hereby drawn to the fact that, in a number of the States, unqualified men, those not trained in the medical sciences (and therefore not veterinarians nor M.D's.), are writing papers on veterinary subjects at the experiment stations. In my investigation I was careful to inquire into the "official titles, duties and work" of those in the agricultural colleges and experiment stations who have been writing papers on veterinary subjects, and I found, in several instances, unqualified men doing this work for the State experiment stations. I have carefully examined the Hatch and Adams Acts, under which the experiment stations were established and endowed, and I declare openly that, in my opinion, the permitting

of unqualified men to do such work is contrary to the spirit and purpose of those acts, and I call upon this Association, in convention assembled, to see that the proper authorities of the Association draw the attention of the Secretary of Agriculture of the United States to the state of things, and to inquire what his interpretation of the law is in this case. The Hatch Act reads: "That it shall be the object and duty of said experiment stations to *conduct original researches or verify experiments* on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same, . . ." The work of unqualified men on veterinary subjects can only be compilation or hodge-podge at best. The judgment of unqualified men on facts in veterinary medicine is not professional; besides it may be a menace to the interests of live stock. The act of writing non-professional papers on veterinary science is a form of quackery, and intensely so when unqualified men take it upon themselves to write on contagious diseases. This kind of thing has been going on in Arkansas, Georgia, New Mexico possibly, Tennessee, West Virginia possibly, and in Wyoming.

There are two excellent veterinarians doing work for the State in Arkansas, Drs. Dinwiddie and Lenton, yet the Director of the Experiment Station, W. G. Vincenheller, has written press bulletins on Texas fever, work which should have been done by the veterinarians. Georgia has an excellent State Dairyman in Professor C. L. Willoughby, a man who commands my respect for his intelligence, yet even he would admit that it would have been better if a graduate veterinarian did the strictly veterinary writing for Georgia instead of himself. New Mexico and West Virginia are suspicious. In Tennessee, that enlightened entomologist H. A. Morgan has done much excellent work on the Texas fever tick. The station of which he is Director now has a veterinarian who collaborates with Professor Morgan in studies touching veterinary science. Yet in 1906, after the appointment of Dr. Jacob as veterinarian in 1905, the Director published a bulletin on "Cattle Tick Eradication," when the qualified veterinarian could have done the work. Wyoming has, in the person of G. E. Morton, M.L., B.S., "Assistant in Animal Industry," a man who paraphrases the works of Dr. James Law on "Abortion" and "Scours in Calves," and that of Dr. G. H. Glover on "Poisonous Plants," sending the information out under his signature in "The Ranchman's Reminder," seemingly an agricultural college paper, apparently as so much work on veterinary science done for the State. The question is not, is the work of these men good and useful in itself, but is it true to the spirit and purpose of the Hatch Act, and *should not veterinary work in the State, more particularly veterinary research work and the verification of experiments, be done by a professional man who devotes his life to that work?*

2. A number of the States have no veterinary department in their experiment stations and no veterinarian on the force of workers. The plea in excuse for this kind of thing may have been, that, under the Hatch Act, the funds were inadequate, and that the grants were used in experimental work along other lines. The attention of the Association should be drawn to the fact that the excuse is no longer applicable and that the time is ripe for the veterinary profession to see to it that experimental work along lines indicated in the Hatch Act referring to veterinary science *be carried out in each State, and Territory* as well by qualified men. Under the Adams Act, which became a law in 1906, the Federal grants for State Experiment Stations are to be gradually increased year by year for five years, beginning 1906, from $15,000 per annum until that sum reaches $30,000 per annum. As these moneys must be devoted entirely to research, each station should have a veterinarian within five years. Montana and Idaho, through this benefaction, will place veterinarians in their experiment stations. West Virginia, Florida, Connecticut, New Hampshire and Wyoming should do the same thing, if the provisions of the Hatch and Adams Acts are to be carried out. As the experiment stations in these States are connected with agricultural colleges wherein veterinary experimentation and research would not be burdensome, the Professors of Agriculture in them would be relieved of the veterinary teaching, which is now outrageously saddled upon them. Veterinary work in those States will then not be perfunctory, as it is now, but be specialized and intelligent. There is a smack of quackery in the announcements at present, for instance, of Professor Clotier, of Florida, that he lectures on veterinary science; of Professor J. J. Hooper, Assistant Professor of Animal Industry in Kentucky, that he talks on the Theory and Practice of Horse-Shoeing; of Professor E. L. Shaw, Associate Professor of Agriculture of New Hampshire, that, among other things, he talks, "On Holding a Post-Mortem," and "Infectious Diseases Affecting Farm Animals, Their Causes and Methods of

Treatment"; of G. E. Morton, Assistant in Animal Industry, Wyoming, who lectures on "Veterinary Medicine and Therapeutics." Surely it is difficult enough for a trained veterinarian to hold a good, intelligent post-mortem, without an Associate Professor of Agriculture attempting to do that work, or at all events attempting to teach men how to do it.

3. In several instances I have been surprised to find that agricultural college professors of veterinary science or State Experiment Station veterinarians are not members of this Association. The many state men who belong to the Association find in its organization a means for mutual coöperation and the exchange of ideas. For instance, the professors of veterinary science in the agricultural colleges of Nevada, Michigan, Maine, Arkansas and Illinois are not members; nor the experiment station veterinarian of Oklahoma. The proper authority of this Association should be instructed to use all the arts of diplomacy at his command to induce such men to join us, for the benefit of themselves and the profession at large.

REPORT OF THE COMMITTEE ON DISEASES.

By V. A. MOORE, Chairman; A. D. MELVIN, L. A. MERILLAT, C. H. HIGGINS, and J. R. MOHLER.

In 1905 the Committee on Diseases, after careful consideration, recommended that this committee be dropped. At the New Haven meeting this recommendation was not adopted and a new committee was appointed. Upon consulting the by-laws the new committee, like its predecessor, failed to find directions respecting its duties or suggestions as to the nature of its work. Heretofore the committee has reported either as a whole or by its individual members on certain phases of some one or more diseases of general sanitary significance. It is evident that members of a committee so widely scattered geographically could not carry out a joint research respecting any animal plague or unite successfully in an investigation of disputed facts relative to other maladies. As there appeared to be no subject before the profession that the committee felt was calling specifically for its consideration, it was decided, after very careful reflection, to follow the method of the preceding committee,—namely, that each member report upon special phases of such diseases as his experience and observation suggest would be most helpful to the profession. To this end, the following program has been arranged:

"Some Principles of Pathology Significant in the Control of Animal Diseases," V. A. Moore.

"Dermal Mycosis in Horses," A. D. Melvin and J. R. Mohler.

"The Disposal of Horses Affected with Occult Glanders," L. A. Merillat.

The individual members of the committee appreciate the fact that such a series of articles does not make a satisfactory report. However, we were willing to serve the Association in some capacity, and, not having a clear conception of our duties, we have each contributed in this individual manner. For these separate parts the authors only are responsible.

In the light of experience and what has already been said, we respectfully recommend that the Executive Committee mention one or more diseases each year which it may think desirable to have further information upon, and that the President select for members of the committee those best fitted by position and location for acquiring the knowledge desired.

SOME PRINCIPLES OF PATHOLOGY SIGNIFICANT IN THE CONTROL OF ANIMAL DISEASES.

Report By VERANUS A. MOORE,
Chairman, Ithaca, N. Y.

In view of the uncertainty of the purpose of the Committee on Diseases and in obedience to the method of procedure which it proposed, I found myself casting about for a topic of general interest to the profession and possessed of sufficient importance in itself to be considered on this occasion. While engaged in this search the story of the drifting seamen came sounding in my ears. Legend has it that a few sailors as a result of a storm were left drifting on a raft. After days of watching they sighted a vessel and signaled for help. The reply came in the form of a question, "What do you want?" "Water," was the response of the thirsting sailors, to which the answer came, "Dip down where you are." At this one of the suffering men took up a handful of water and found, much to his surprise, that it was fresh. They had drifted into the mouth of a great river and were dying of thirst on the surface of a sea of sweet water. This reminder of the immediate resources of the practitioner, in the rapidly increasing technical knowledge of disease, suggested that a part of the report of this committee might deal with the application of a few principles of pathology to the handling of those diseases and morbid processes which we are all striving to master. I have sometimes felt that in the battle with disease the members of the medical professions, both comparative and human, are much in the position of the sailors in the legend, in that they do not appropriate either to themselves or for the benefit of others the relief-giving aids which science has strewn round about them. My choice of this topic is in response to an irresistible desire, prompted by observation and experience, to attempt at least to bring into focus a few fundamental principles in the general warfare against disease.

The first of the principles to which I desire to call attention is that of preventive medicine. *The logical conclusion drawn from a true conception of the nature of the infectious diseases is prevention.* Pasteur believed that it was within the power of man to eliminate the infectious diseases from the face of the earth. To this end National, State and city governments have made special provision by legislation and appropriation, and they have profited by many successes. A student of sanitary police, however, will soon recognize that such diseases as glanders, tuberculosis and rabies, as well as many of the lesser maladies, are being allowed to spread, often extensively, because of the neglect of adequate methods for combating them. The veterinarian stands in his relation to the stock owner as does the sanitarian to the health of the community and in this capacity he is, and justly so, held responsible by the owners for the prevention of animal plagues. The methods of prevention are varied, but of whatever kind they are supposed to be inaugurated, or at least, applied by the veterinarian. I am aware that some practitioners feel that sanitary work should be looked after by others; but this indifference to become co-workers in the fight against preventable diseases by mastering the fundamental methods by which success is obtained, is causing certain of our State agricultural colleges, such as that of Wisconsin, to give special instruction in preventive medicine to their students. Knowledge is by right common property, and as live stock owners are becoming better instructed in the possibilities of prevention, they are looking more and more to their veterinary advisors for counsel relative to the detection, prevention, and elimination of threatening diseases.

In the United States there is over $3,000,000,000 worth of animals over which this profession is in charge relative to the prevention of their communicable diseases. To assist in this work our National and State governments expend, including the Federal meat inspection, more than $4,000,000 annually. Notwithstanding this enormous expenditure, tens of millions of dollars' worth of animals are dying annually from preventable diseases. It would seem, therefore, that one of the duties, if not the first duty, of every veterinarian is to become proficient in the science of preventing diseases, especially those for which there is as yet no means of healing. Surely the success of the profession depends much upon the value of the assistance its members afford, both to their clients and to the State in the prevention of disease.

A fundamental principle in the control of disease is the application of methods of precision in diagnosis. In treatment, as well as in prevention, the first and most important task is making the diagnosis. Formerly this was done from the history together with certain signs and symptoms. With the introduction of the new pathology there came certain methods by the use of which one is enabled to look deeper into the structure of organs or into the nature of disease processes than it is possible for the unaided eye to penetrate. Methods of precision must of necessity require the use of instruments and apparatus by which determinations can be made more accurately than it is possible for man to obtain without such aids. Such methods have largely been brought out in laboratory investigations, and for their application it is quite generally believed that a well appointed laboratory is necessary. In certain instances this may be true, but for the great majority of work for which they are desirable, it is not so. In most cases the apparatus is simple and the method requires only the knowledge and skill that application will bring. Methods of precision are not separate and distinct from practical professional work, but valuable adjuncts thereto. A wrong diagnosis, for instance, which might lead to a very erroneous treatment, of the character of a urinary sediment or of a purulent looking substance, is exceedingly easy to make when one trusts to the unaided eye, but it should be impossible when microscopic aid is employed. The close resemblance in the clinical appearance between abnormal growths, composed of formative inflammatory tissue and certain malignant tumors, often necessitates, to make the differentiation, a knowledge of minute pathological structures and of histological technique. The examination of the blood, which reveals most valuable information relative to the internal soundness of the animal,—the presence or absence of anemia, the presence of suppurating lesions and of certain parasites, gives aid of the highest practical value to the clinician. This knowledge not only enlightens one on the true condition that exists, but it clarifies the treatment. For instance, iron is recognized as a remedy for anemia. It is of great value when the hemoglobin is low and the red corpuscles are normal, or nearly so in number, but it is of little or no value when the red corpuscles themselves are greatly reduced. To be accurately informed in these cases requires but a little time, a reasonable training and the addition of a small equipment.

An inquiry into the loss of live stock values from disease shows great depreciation from impairment and death of animals due to the so-called general diseases and dietary disorders. These are the ailments encountered by every practitioner, and it is to reduce the losses from these causes that there is need for the application of definite scientific methods. A general disease or localized morbid process cannot be rationally treated unless its nature is known; and it is to put the practitioner in possession of as much of this important knowledge as possible that this plea for the more general use of methods and instruments of precision is made.

Unfortunately, there is a feeling which occasionally finds expression, that the finer determinations made by instruments and methods of precision are detracting from the skill of the clinician. Such views exemplify a misunderstanding of both the mission of the veterinary profession and the purpose of accurate methods of diagnosis. Such methods are not to detract from skill in detecting diagnostic signs and symptoms but to make one more certain of his observations. They are to verify or disprove the conclusions drawn from physical examination. There are undoubtedly many changes taking place in making diagnoses, as a result of these newer methods and they are upbuilding and dignifying the profession. We do not wish to exchange our Pullman car for the old stage coach, nor the reaper for the sickle. We do not wish to abandon the clinical thermometer, or ignore the results of urine examination to accept the guesses prevalent before their time. No one would care to trust to a diagnosis of tuberculosis in a recently infected animal without the tuberculin test or of glanders without mallein. Accuracy in the diagnosis of many morbid processes cannot be assured without means of determination more positive than their symptomology alone suggests. Not long since I had occasion to search through the case reports in order to determine the frequency and geographical distribution of certain pathological formations. After reviewing hundreds of cases I was discouraged to find how few of them could be accepted as genuine because of the lack of adequate means in making the determination. We are inclined to forget the weakness of opinions unless they are based on facts, and the facts determined by accurate recognized methods. Certainly all possible assistance afforded by methods of precision could not tend to lessen the natural or acquired ability of the clinician; but on the contrary, experience has shown that with the use of finer methods the powers of observation in clinical work have become more keen and critical than they were before. If one acquires definite information regarding one symptom he will strive more earnestly to make his knowledge of the other manifestations as definite and exact as possible. The purpose of finer methods is to increase the powers of observation. If all the present knowledge and methods were made use of, the elements of error and of accident would cause mistakes enough to occur.

As the infectious diseases are responsible for heavy losses among animals, the principle of infection is of great importance. This means simply the invasion and indwelling of the animal body by microscopic living organisms. An inquiry into the present knowledge of the infectious diseases shows that in their production and dissemination they are obedient to definite laws which appear to be well within the limits of human understanding. In brief, the distinguishing characters of these maladies are a specific infection; a period of incubation; the nature and duration of the morbid changes, and the dissemination of the virus. These all vary, but within certain limits according to definite laws. These laws are found in the operation of the natural forces for the spreading and means of contracting the virus; in the degree of resistance or of susceptibility of the host, and in the virulence of the invading organism. They involve a knowledge of the life conditions for each of the pathogenic microbes. If one subjects the various outbreaks among domesticated animals to careful analysis according to the principles of infection, they will fall naturally into two groups, one in which the causal factor is infection, the other those which are the result of dietary or other causes of a temporary and local character. The presence of an epizoötic disease is a serious matter. It is of the highest importance, therefore, that when a disease apparently of a specific nature appears, that a true diagnosis be made in order that the best methods for preventing its further spread may be employed.

To make an accurate diagnosis is not always easy, but to differentiate between a specific infectious disease and some other cause that might destroy a large number of animals ought not to be difficult. Many unsuspected agencies, capable of causing death, may creep in with the introduction of new methods of management. Some years ago in the State of New York there were reported a large number of outbreaks of hog cholera, and thousands of swine were lost. An investigation showed that the cause of death was not a specific disease but a poisoning due to powdered soap that was allowed to go into the swill. This illustrates one of the many effects upon animal life that may be expected from the constantly changing customs and economy of the people. Not long since I was requested to investigate a serious outbreak of a so-called infectious disease among swine on the farm of one of our Soldiers' Homes. Several hundred pigs had died and the diagnosis of hog cholera had repeatedly been made. An examination showed the pigs then sick to exhibit a great variety of symptoms and those dead to lack the morbid changes of a known specific disease. In the swill barrel was found a number of bottles and paper boxes containing Fowler's solution, aconite, strychnine tablets, antikamia and the like. The pigs were being fed the refuse from the hospital together with the garbage from the kitchen; and the cause, from the many deaths, was diagnosed a specific disease. Had the principle of infection been heeded such an error could not have been made. Anthrax, blackleg, actinomycosis, glanders, and rabies, each possessing a positive and definite means of diagnosis, are frequently mistaken, largely because definite methods are not employed.

The devious channels of infection and the multitudinous ways of its manifestation through metastasis and otherwise, bring to our notice great numbers of common but perplexing morbid processes due to infections of various kinds and as sequellæ of acute specific diseases. The work of Nocard relative to white scours in calves, of Mohler relating to the large number of lesions produced by *B. necrophorans,* and the great variety of morbid processes known as *Botryomycosis,* illustrate the importance of this phase of infection. The failure to thoroughly apply the simple precaution of proper disinfection costs this country thousands of animals annually. I was deeply impressed recently by the remark of a teacher in agriculture on the great extravagance of the veterinarians in permitting so many losses from common infections.

Of the laws governing infection there are none more trying to meet than those pertaining to the dissemination of pathogenic microörganisms. The subtile powers of certain bacteria to cling to their hosts after symptoms have disappeared, the uncertainty of the period of incubation, the incipient and chronic cases, are all potent factors, often neglected, in the spread of disease. To persuade those interested in the exchange of animals that many of their losses are due to the neglect of these elements in the laws of microbian dissemination is one of the highest and likewise most difficult duties of the practitioner. The detection of cases in the early stages, at least before symptoms appear, is possible with certain maladies such as tuberculosis and glanders, but with the others we must as yet depend on general principles and not specific methods.

The laws now in force in certain states, demanding the application of tuberculin to all cattle admitted and the rejection of all reactors, will soon become general, and it may be followed by laws requiring this specific test of animals exchanged within the State. Such a bill came very near passing the Wisconsin Legislature this last session. What is now true for tuberculosis may become the practice with glanders and possibly other communicable diseases. To meet with the highest success along these lines the veterinarian must coöperate with the live stock owner. This appears to be very important, for at the present time the agricultural colleges are making equal, if not more rapid, progress than the veterinary colleges in educating their students and followers in the principles of infection and methods for preventing the spread of epizoötic diseases.

Attached to the great veterinary clinics of Europe, one finds a chemical, bacteriological and pathological laboratory primarily for the purpose of diagnosis, but secondarily, for teaching the coming veterinarians the absolute necessity for good results of a working knowledge of the principles of infection and methods of accurate determination. It seems that a most important work for this great Association is to unite in bringing into everyday practice the application of methods already known for accurate diagnosis and prevention as well as for treatment.

Since Bouchard published his lectures, there has been no more difficult pathological problem before the veterinary profession than determining the significance of autointoxication. The prominence it has gained in human pathology suggests the great importance of large quantities of unabsorbed and waste food present in the digestive tract. The recent work of Gilbert showing the dependence of many disorders on the direct or indirect action of the products absorbed from the intestine is of much significance. Equally suggestive are the conclusions of Edgren that autointoxication is responsible for a large percentage of cases of arteriosclerosis. The work of Dawson on astheniæ, or "going light" in chickens, is a good commentary on the affect on metabolism of the absorption of a specific microbian product. From the results ascribed to autointoxication in the production of delirium, coma and cerebral paralysis, it is possible that many obscure cases of apparent cerebral or spinal trouble, especially in horses, may be traced to this cause. Cholemia and eclampsia are further illustrations of the effect of the retention of products that normally are eliminated by the liver and the kidneys. In the control of disease, the organs of elimination are undoubtedly deserving of more careful attention.

The principles of immunity and vaccination are presenting many problems for the sanitarian and practitioner alike. The dread of infection and the success of certain antitoxins, such as that of diphtheria in man, and of tetanus as a prophylactic in horses, afford premises for arguments apparently logical but in fact mere sophistry for venders of all sorts and kinds of serums, antitoxins and vaccines. There is nowhere in the realm of professional knowledge a subject which requires a keener discrimination between that which is known, that which is still experimental, and that which from known laws cannot be true, than in the use of measures for producing artificial immunity. Here, again, one must depend upon principles and not upon isolated cases or coincidents.

Finally, the control of disease among domestic animals seems to rest largely in the hands of the individual veterinarian. He is the guardian over the flock within his own jurisdiction. He is first to make the diagnosis, and to him falls the high privilege of initiating the treatment whether therapeutic or preventive in character. To live up to the full measure of this responsibility requires a close adherence to the principles which govern the cause, diagnosis, prevention or treatment of disease and absolute integrity in carrying out the details. To apply the principles, the methods must be known. When we come to fully appreciate the application to our individual work of the truth of the axiom, that "a chain is no stronger than its weakest link," we shall have a standard by which to measure, each his own strength, in lifting the burden of disease from dumb creation and in helping to place the practice of veterinary medicine among the great and beneficent professions.

A FEW WORDS ON THE DISPOSAL OF GLANDERED HORSES.

Report By Dr. L. A. MERILLAT,
Chicago, Ill.

The pathology of glanders is now a finished study, and the diagnosis of the occult cases is facilitated by no less than three standard methods, but these disclosures have served to complicate the sanitary regulation of the affected and exposed subjects instead of simplifying it. In past decades it was thought sufficient to kill the affected horses, disinfect the premises and keep the exposed animals under surveillance pending the development of new cases. It was not suspected that so many of the exposed horses became affected as the new methods of diagnosis now show. The history of each isolated outbreak generally ended after the first clinical cases were dispatched, or at least after the very small percentage of the exposed animals which developed into "diagnosable" cases were likewise disposed of.

The new methods of diagnosis, especially the mallein test, have shown that horses exposed to clinical cases of glanders through stable cohabitation will rapidly become infected with the disease in variable degrees of intensity. Some of the exposed contract the disease in the most trivial form imaginable in some hidden focus that defies disclosure on post-mortem examination; others which are generally in the minority will develop a generalization of the infection that will soon manifest itself clinically on the surface of the body; whilst others, which are always in the majority (when a considerable number are involved), present the disease in all of the intermediate phases between these two extremes. It sometimes happens that 60 per cent. to 70 per cent. of tested horses show a more or less typical reaction, and not infrequently, especially in small stables, all of them may prove to be infected. Thus, mallein, in an unmistakable manner, has shown the recepticity of equines to the bacillus malleï, quite as strikingly as it has also demonstrated the powers of resistance by the innumerable cases which recover.

The disposal of these occult cases, which a decade ago would never even have been suspected of being diseased with glanders or any other constitutional affliction, is admittedly an intricate problem for the equine sanitarian. Some have taken the radical stand that all reacting horses should be killed without ceremony, whilst others content themselves by slaughtering only the clinical cases. It is a conservative stand, between these two radical ones, that I write to champion, knowing that it is sufficient to successfully and permanently stamp out the disease in any given stable with a minimum loss in contra-distinction to methods which either leaves the disease unchecked or else needlessly sacrifice so many animals.

To face the problem squarely and honestly, it must first be admitted that glanders is essentially an equine disease; that it is no menace to the public health; that it concerns only the owners of horses and mules; and lastly, that it never assumes the proportions of a plague. Bovines have been experimentally inoculated, but there is no case on record to our knowledge wherein any animal of this species has been naturally infected by exposure to affected equines. In short, all the domestic species, except the equine, are manifestly non-receptive. In man, glanders is exceptionally rare, and when this fact is coupled with the very close relations which constantly exist between man and the horse the immunity of man is strikingly illustrated. In the study of hygiene the close relations of man to the horse has no parallel, and yet very, very few human beings ever contract the disease from glandered horses. Glanders does not, therefore, concern the human sanitarian, nor is there any alarming situation at hand which would warrant its classification amongst the animal plagues. It is but an equine contagious disease that gives early warning of its existence and that yields to sensible management.

The old laws which were enacted before mallein are at best inconsistent measures in that they give officials charged with their enforcement the authority to slaughter everything that happens to show an elevation of temperature with other real or fancied phenomena from mallein, when in fact the word "glanders" at the time of their enactment aimed to designate a loathsome nasal catarrh or cutaneous pustulation, but never an invisible disease that does not even affect the general health, and officers entrusted with the enforcement of these laws often meet with a very stubborn opposition to any other interpretation of the word. When horses other than marked cases are condemned under such laws a lively controversy ending in an adverse court decision is generally the result, which is to say, that whenever the glanders problem is thrashed out on its merits wholesale slaughter of occult cases is decided to be a needless destruction of private property. The matter of adequate or partial indemnity is not as much the issue as the propriety of killing apparently healthy horses. It does not matter whether the loss is public or private; the question confronting the veterinary profession is the selection of menacing from non-menacing animals with the end of conserving the property of the unfortunate owner without jeopardizing that of others.

Mallein has taught that many occult cases of glanders are incurable, but it has also shown that many horses recover permanently, live useful lives in good health and then die from other causes. These presents are incontrovertible. It also happens that these incurable horses may work well and maintain a state of exceptional good health for years with only an occasional clinical case developing among them, with the result that the owners, by submitting to frequent inspection, have received the benefits of their work year after year without apparent harm to their new purchases or their neighbor's horses.

That even the worst of these incurable occult subjects are capable of transmitting the disease to others, under nominal isolation, is an open question, but the salvage they bring in work is always found to exceed the damage they are capable of doing to other animals by infecting them with glanders. It is very probable that only the clinical cases are capable of spreading the disease. If there is any exception it is the seriously affected non-clinical cases, but as these are rare and can always be selected by the mallein test, their disposal according to the circumstances dispatches this one menacing element.

One of the most erroneous impressions that seems to prevail among veterinarians to-day is that "ceased reaction" is an indication of a cure. No greater error than this could be made in dealing with outbreaks of glanders. It has frequently lead to the spread of the disease from the initial centre. In this connection, it should be remembered that there is a vast difference between "ceased reaction" and "acquired toleration;" that is to say, the toleration to mallein, which is always readily established by repeated injections, is too frequently regarded as evidence of a cure, with the result that the horses so misjudged, after being released from quarantine, break out into bad clinical cases, to the dismay of the mistaken veterinarian. Such animals may have passed from owner to owner and finally become clinical cases many miles away from the scene of the last misinterpreted test. It is only recently that a veterinarian of the United States Army found occasion to condemn mallein as a cure because a "ceased reactor," to his surprise, was found to be still seriously affected. One more acquainted with mallein would have been less chagrined and little surprised, and would have restrained or condemned this animal as incurable after the second or even the first test.

When a horse once shows a real, typical, pronounced reaction to mallein in two or three successive tests at intervals of sixty days, the chances of recovery are nil. Such an animal will probably always have glanders, will break out into a clinical case under the influence of a debilitating disease or injury, and should never under any circumstances be released from quarantine. When the owner is through with such an animal it should be killed. In spite of the fact that in such cases injections of mallein at short intervals will cease to produce any thermic or local reaction, the animal is not safe enough for traffic.

Mallein reaction may easily be classified into four classes: *slight, nominal, pronounced,* and *atypical,* to facilitate the disposal of the affected animals. The *slight reaction,* which in order to deserve the designation and to keep it out of the atypical class, must present all of the phases of a mallein reaction. There is only a trivial manifestation of the thermic, the local and the systemic disturbance, but the reaction is real; it is characteristic, uniform; it can be explained as a mere co-incident; and if need be, the agglutination test will prove that the animal is infected. In large stables tested by mallein, immediately after the clinical cases have been killed, many of the animals will show this class of reaction. If killed it may be very difficult on ordinary post-mortem to demonstrate the location of the infected focus. A test sixty days later will generally be negative, but when there is still a slight reaction at the second test, a third one at the end of a second sixty or ninety days will generally show that the animal has successfully resisted the infection. To kill such animals is murder without provocation. The *nominal reaction* is a more serious affair. In this class the phenomena are uniformly typical but more marked. The fever is higher, the swelling is larger and more painful and the dejection is marked, unmistakable. If killed, lesions are generally found in the splanchnic organs or ganglions. Tested in sixty days, they may show either an improvement or accentuation of the disease, which must be taken into account in their final disposition. Those showing an improvement may prove to have been cured at the third test sixty to ninety days later, while those showing an accentuation will generally react at the third test and finally be placed amongst the incurables. The killing of such animals after their real condition is finally determined is justifiable, however, only where they cannot be kept under surveillance and when the number of exposed is out of proportion to the affected. For example, it would be ridiculous to allow such an animal, especially of small value, to jeopardize a whole stable, while it might be sensible to preserve fifty such animals among only twenty other healthy ones, because as before stated, these affected animals will without much danger of spreading the disease work satisfactorily to the benefit of their owners. An occasional clinical case among them may develop, but it is remarkable how few these will be under ordinary conditions of hygiene. The *pronounced reaction* indicates at once incurable glanders, and is always sufficient cause for immediate slaughter of the animal showing it. It refers to an exceptionally high temperature of long domination and slow defervescence, large, painful œdema at the seat of inoculation, and a pronounced state of dejection sometimes accompanied with chill and loss of appetite. It is always pretty safe to announce that such an animal is incurable and to recommend its slaughter without ceremony. If killed, characteristic lesions are found in the lungs, bronchi, liver, lymphatic ganglions of these organs, or in all of them. If scrapings of these lesions are injected into the peritoneal cavity of cavies the typical orchitis will always supervene. There is seldom any excuse for conserving the life of such animals, although it is by no means unusual for even such animals to work for years before the disease becomes clinical. The danger of spreading the disease by such animals is, however, undoubtedly greater than those showing the slight and nominal reactions.

The *atypical reactions* from mallein are legion. That is to say, many horses injected with mallein will leave the inspector in doubt by the absence of one or more of the typical symptoms of a reaction. The temperature may raise to an exceptional height without a corresponding local disturbance, or a reverse condition may prevail to the decided confusion of the inspector. If the invasion of the fever is sudden, the dominance brief and defervescence rapid, the reaction may be called atypical, uncertain or indecisive, even though the other signs are in evidence. On the other hand, a marked local reaction in the absence of a fever to harmonize with it, must be cautiously judged. In short, mallein reactions are sometimes too freakish to be interpreted as positive evidence of glanders. Too often the disease is not found on post-mortem. Whenever such animals are encountered the plain duty is to postpone their disposal until after a second test. An illustrative case of this class of mallein reactions is that of a large gray draft horse affected with an obstinate unilateral, purulent rhinitis of more than a year's duration, which, although easily traceable to a dental disorder, was accompanied with a general state of unthriftiness that could not be explained. A mallein test, given with the object of excluding glanders as the possible cause of the state of ill health, produced a sudden rise of the temperature and a pronounced chill seventeen hours after the injection. The fever rose to 104° F. during the seventeenth hour, remained about that high for two hours, and then suddenly fell to normal. The seat of infection was slightly tumefied. This freakish behavior of the temperature, together with the tumefaction of the sublingual gland, left me at sea as to whether I was confronted with glanders or not. It was, however, decided to sacrifice this animal on account of the large number of valuable animals that were exposed. The post-mortem diagnosis which was afterwards confirmed by a bacteriological examination, proved the horse to have been suffering from generalized tuberculosis. There was no glanders nor evidence of glanders in any organ. Another illustration of the freakish behavior of mallein is shown by a test of some forty farm horses on a hot summer day. All of the animals in question had been in pasture for a period varying from several weeks to several months. The sudden appearance of a case of clinical glanders among them lead to the testing of all of the others. The horses were stabled for the test on Saturday night. The injection was made at ten o'clock P.M., and on the next day, which was exceptionally hot, every horse reacted alarmingly. The temperature ranged from 104° to 107° F. It appeared that every animal was affected, but this amazing result led to the suspicion that some other influence besides mallein was at work, and that these suspicions were correct is shown by the second test in cooler weather, at which not a single horse reacted and by the fact that not a single one of these horses ever developed glanders. Here is an instance where forty horses might have been needlessly slaughtered. Other analogous observations coincide with the above in every particular. That other conditions inherent in individual animals often influence the reaction following mallein sufficiently to bring non-affected or only slightly affected horses into the condemned group, has likewise been frequently shown to exist by the perfect health of the suspected animals for years thereafter.

The question of what constitutes a mallein reaction, by which an official may arbitrarily institute a wholesale slaughter of horses, is intricate in the extreme, and can only be decided by men who have had considerable experience with glanders and with mallein.

If every horse that will react to mallein in one way or another were slaughtered many perfectly healthy animals and many curable animals would be needlessly sacrificed. It would be often absolutely impossible to prove the existence of the disease post-mortem. The most searching examination of the organs supplemented with the most elaborate laboratory methods of diagnosis will as frequently fail to prove the existence of the disease, as the crude field autopsy, in many of the horses that present a so-called reaction to mallein, unless the phenomena is properly interpreted and carefully judged.

A safe mallein test should first of all consume three days instead of only two as usually recommended, and there should be a striking harmony between the thermic, local and systemic disturbances. The domination of the fever should be a prolonged one. A sudden defervescence after only a short dominance is decidedly negative no matter how high a point the fever may reach, in contra-distinction to the more positive long and deliberate domination that is much lower. The animals should be kept during the test in natural and accustomed conditions and the administration should be aseptic. The temperatures should be taken for thirty-six hours on all horses that still show an elevation at the end of the first twenty-four hours, or even longer when a febrile state persists, and the duration of this domination should be given much more weight than the rise.

The sensitiveness of the injected focus is at its height twenty to twenty-five hours after injection, and the œdema is largest at about thirty hours. The greatest amount of dejection is observed between the twentieth and the thirtieth hours. The fever generally reaches its highest point between the fourteenth and twenty-second hours. A real mallein reaction, therefore, consists of a rise of temperature that reaches its height between the fourteenth and twenty-second hours and gradually recedes during the third day, a tumefaction at the seat of injection that reaches its height between the twentieth and twenty-fourth hours and a pronounced state of dejection between the twentieth and thirtieth hours. Whenever this order of things is manifestly changed there is reasons to be cautious, but when it is surely in evidence there is no danger of not being able to prove the disease.

CONCLUSIONS.

1. Glanders spreads rapidly under favorable conditions, and slowly, but quite as surely, under unfavorable conditions, to a large percentage of horses exposed by stable cohabitation to clinical cases of glanders.

2. Amongst the many horses that become infected, most of them will recover; some of them develop into incurable but non-clinical cases, and a very small percentage of them develop into clinical cases.

3. Debilitating influences such as disease, injury, hard work, deficient foodstuffs, etc., favor the transformation of non-clinical into clinical cases, whilst invigorating influences are as promptly curative.

4. The spread of glanders from non-clinical cases, except those that show a pronounced high reaction, is indeed slight. The salvage they bring to their owners in work exceeds the damage they are capable of doing to other horses. It is very probable that only clinical cases spread the disease sufficiently to warrant consideration in that connection.

5. Horses which react to mallein two, three and four times, at intervals of ninety days, seldom ever recover, and should never be removed from quarantine. If they cannot be kept under surveillance they should be killed.

6. Repeated injections of mallein at short intervals will soon establish a tolerance that must not be mistaken for a cure. Animals seriously affected with glanders that have become accustomed to mallein by repeated injections will always react again after an interval of ninety days.

7. The killing of the clinical cases of glanders, the disinfection of the premises and appurtenances, the ventilation of the stables and general improvement in the hygiene, is alone sufficient to stamp out outbreaks of glanders. But to make these recommendations more safe the slaughter may be made to include those showing the pronounced reaction above described.

8. The killing of every horse that shows a reaction to mallein, according to the varied opinions as to what constitutes a condemning reaction, is not necessary to stamp out glanders from any given stable, but when the reactors are few and the exposed are many, it might be sensible to dispatch the disease at one stroke. On the other hand, when the reactors are numerous, as compared to the total inhabitants of the stable, a casual supervision to detect the development of new cases with occasional injections of mallein will finally accomplish the purpose.

9. In short, glanders is not such a terrible scourge after all, and where prompt measures are taken to stamp it out, the actual losses are always trivial.

10. The glanders question is so strictly an economic one that it is much the duty of officials having it in charge to protect the useful affected subjects as the exposed ones. They are always useful and generally harmless, and hence should be preserved to their owners so long as they do not menace the property of others.

11. By inaugurating a wholesale slaughter of everything that happens to show a real or fancied reaction to mallein, an official will sooner or later subject himself to the criticism of "making much ado about nothing."

DISCUSSION.

Dr. McGilvray: Mr. President and Gentlemen, I have listened with great interest to Dr. Merillat's statements as contained in the paper just presented by him, and it does not seem, at least to me, that an opinion like that expressed therein should go forth as being an expression of opinion accepted by all the members of this Association.

During the past few years the disposal of occult glandered horses has been given serious consideration and attention by the Federal authorities in Canada, and I might state that considerable trouble and difficulty has been experienced in dealing with glanders in various parts of Canada. With more especial reference to the province of Manitoba, conditions in which I am familiar with, glanders was prior to 1905 handled along somewhat similar lines and under such methods as advocated by Dr. Merillat, and as a result thereof the diseases was rapidly becoming more widespread. However, during the Spring of 1905 the Veterinary Director General for Canada (Dr. Rutherford) succeeded in having Manitoba brought under the Federal Contagious Diseases of Animals' Act. Glanders was, however, also becoming more prevalent in other parts of the Dominion, making it clear, to those conversant with the true nature of glanders and its control, that the "old" methods were not effective in suppressing the disease or even in materially preventing its spread; hence it was decided by the Veterinary Director General to adopt and enforce a policy which has now proved to be a more efficacious method of dealing with glanders.

These conclusions were arrived at by him after the testing and re-testing method had been given a fair trial and in keeping close observation and a careful record of all horses which had reacted typically to one or more mallein tests, but which failed or ceased to react to some subsequent test or tests. Those occult affected animals, and, in some cases, ceased reactors, were in the mean time definitely marked and re-tested at intervals covering an extended period, and it was found that, while some ceased to react and remained apparently safe, others again reacted at intervals, and some of which were later found to be responsible for fresh outbreaks of the disease without having themselves developed any outward manifestation of disease, while others have developed well marked clinical symptoms after having ceased to react. These results, therefore, convinced the department, through its officers, that it was not safe to adopt nor continue such a method as that.

In dealing with occult glandered animals the fact must be kept in view that at present it is impossible, during life, to differentiate between the presumably innocent animal and the dangerous occult glandered animal or otherwise so-called ceased reactor, hence it is apparent that a more rational and safe method in the control and eradication of such a disease is to put such individuals out of existence. If not, in the control of glanders, this class of animal would keep accumulating and increasing in numbers, constituting a continued and ever present source of danger to other healthy animals, necessitating sooner or later a widespread quarantine of suspected and contact animals for an extended period of not only months but years.

Before the change was made in Canada to the present method, departmental figures showed that up to and including the year 1905, the disease was rapidly on the increase as a result of the methods then in vogue. For example, in Manitoba alone during 1903 60 horses were destroyed for glanders; in 1904 160, while during 1905 over 700 were destroyed. Thus showing plainly that the disease had largely increased under the existing conditions and "old" methods of dealing with occult glandered animals. Since, however, that Province has been under the Federal Contagious Diseases of Animals' Act, and all affected and suspected horses are submitted to the mallein test and reactors destroyed, the disease has shown a marked decrease both in the number of outbreaks and animals destroyed.

It must be distinctly understood, however, that any horses that give a doubtful reaction are not wantonly destroyed but are held for retest, but if at a second test they positively react they are destroyed. If on the other hand they absolutely fail to react they are released. Again contact animals which do not react at the first test are also retested so as to decide definitely their freedom from the disease in the occult state. In these cases where contact horses are tested and react and are again tested at the end of forty or sixty days, as the case may be, they may, even in the absence of clinical symptoms, be considered as occult glandered and should be destroyed no matter whether the individual owner is satisfied or not. If, however, on the other hand, such animals have failed or ceased to react or the reaction becomes practically nil, they should be held under close quarantine restrictions and whether classed as ceased reactors or not they are nevertheless dangerous animals which should be prevented from accumulating in numbers, as many of such animals have been known, though ceased to react and apparently healthy, to have nevertheless developed clinical symptoms afterwards.

There is another point also about occult glandered animals, and that is the tendency for them to remain apparently healthy under favorable media for an extended period. We have found repeatedly, in a district where outbreaks of glanders have occurred and which have previously been free from the disease, that it is very often due to the introduction of occult affected animals from the Western range country, and very rarely is it due to the introduction of clinically affected horses. We find occult glandered horses, though apparently healthy, coming from the Western range countries such as Alberta and Montana to remain, while on their native heath apparently healthy, but that this class of animal if shipped to the larger centres such as Chicago and Kansas City, for example, and placed under domestic conditions and work that they very soon develop clinical symptoms. In this connection we had this phase of the occult glandered horse coming from the Western range countries brought very forcibly to our notice during the year 1905. The British Government sent out experts to obtain remount horses which were obtained in Alberta from the ranges, and were only bought after close physical veterinary examination. They were loaded in suitable cars and shipped by rail. However, while *en route* the train became derailed and the cars wrecked; nineteen uninjured animals escaped into the uninhabited adjacent country, but were soon recaptured and brought back to Winnipeg, where they were immediately sold at public auction and purchased by parties located at widely separated points. Within six weeks no less than seven out of these nineteen had developed clinical symptoms of glanders, and upon tracing and testing the remainder, only two of these subsequently proved to be free from infection.

In view, therefore, of this fact of occult glandered animals remaining, under certain environments and locations, in an apparently good state of health for an indefinite period, the authorities in Canada now submit horses presented for entry to the mallein test at the port of entry unless accompanied by a satisfactory test chart. From experience gained in control work with glanders I do not, and cannot, agree with Dr. Merillat's opinion with regard to occult glandered animals or ceased reactors as they are a dangerous class if only from the fact that from out of their numbers arise individuals responsible for fresh outbreaks of the disease and all possible traffic or migration of this class of animal from one point to another should be restrained as they are a dangerous factor in the spread of glanders.

DERMAL MYCOSIS, ASSOCIATED WITH SARCOPTIC MANGE IN HORSES.

By A. D. MELVIN and J. R. MOHLER.

INTRODUCTION.

While supervising the field work of the Bureau of Animal Industry in 1901, the attention of the senior writer of this paper was attracted to a peculiar skin disease among the horses on the Umatilla Indian Reservation near Pendleton, Oregon. A preliminary examination of the scurf and hide of a number of infected horses indicated that the disease was somewhat dissimilar to any disease produced by animal parasites, and suggested the possibility of the cause being of vegetable origin. This conclusion was reached owing to the generalized appearance of the lesions on the affected animals, the apparent short period of incubation and the inability to find any mange parasites even though many animals were inspected and the scabs scraped deeply, warmed and examined by a good hand lens. That the disease was contagious was evident from the history of the outbreak and from the great number of animals found to be suffering with the affection in various stages of development. At that time about 6000 horses were kept on the Reservation, and it was estimated that over 2500 of these animals were more or less affected with this cutaneous disease. Owing to the interest attached to the determination of the true character, as well as with the hope of elucidating the causation of the disease and of suggesting appropriate treatment, portions of the hide from several badly affected animals were obtained and forwarded to the Pathological Laboratory for investigation.

PRELIMINARY INVESTIGATION.

An examination of the first samples of skin forwarded to Washington failed to show any animal parasites or any indication of their presence such as the egg cases or eggs of a parasite or its gallery or burrow. Both stained and unstained scrapings from the skin were examined at first and then sections of the tissue were prepared and studied. In each instance a large number of sickle-shaped spores of a fungus were observed, principally in the hair sacs, though occasionally in the sebaceous glands. Other specimens of skin were received from time to time until about thirty samples in all had been forwarded. In all these specimens this identical fungus was found invariably, and in addition some of the hides showed the presence of the mange parasite, sarcoptes scabei, var. equi, but they were not in sufficient numbers on any sample to account for all the lesions observed. In the majority of cases, however, only the fungus was present to account for the skin alterations, and an attempt to isolate this organism was thereupon made. The hide was seared with a hot spatula and small cubes were removed with sterile forceps, smeared on potato medium and then placed in a test tube containing bouillon. Potato and bouillon media were also inoculated direct from the seared surface of the skin by means of the platinum needle. Several of the remaining hairs on the hide were also used for making cultures by pulling them out with sterile forceps, snipping off the root end by means of sterile scissors and allowing them to fall into a tube containing potato or into melted agar which was afterwards plated. The first successful culture was obtained on potato as a result of this last method of sowing the root of the hair upon this medium. Cover glass preparations made from these various cultures showed the presence of a fungus containing numerous cresentic, sharp-pointed, segmented spores like in the microscopic sections of the skin and which were recognized as belonging to the group of fungi known as Fusarium. To this species of the fungus Nörgaard (Science, Dec. 6, 1901, page 898) has proposed the name, fusarium equinum, since up to that time no other species had been known to exist parasitically in or on horses. In 1904 Sheldon (17th Annual Report, Nebraska Agricultural Experiment Station, page 23) described the presence of a dry rot on corn caused by a fusarium called by him, fusarium monoliforme. This fungus was found by Peters (17th Annual Report, Nebraska Agricultural Experiment Station, page 13) to be present on all the farms where a peculiar disease of animals was investigated. The horses would lose their hair and hoofs and were said by the stockmen in the community to be "alkalied." Cattle and hogs on these farms were likewise said to lose their hair and the chickens to lose their feathers, and Peters attributed it to the feeding upon mouldy corn affected with fusarium monoliforme. Feeding experiments conducted upon hogs with this corn, as well as with pure cultures obtained from the mouldy corn, reproduced the symptoms in the experiment animals.

Bitting (12th Annual Report of Indiana Agricultural Experiment Station for 1899, page 44) describes the isolation of a fusarium from mouldy corn which was incriminated in the production of forage poisoning of horses. A bacterium and another fungus were likewise isolated from the same mouldy corn, but no appreciable results followed the feeding or inoculation experiments with these organisms nor the subcutaneous inoculation of an active growth of the fusarium. Cornmeal inoculated with the fusarium and fed to horses, however, produced redness of the gums and some salivation. The mouldy corn was then fed in its natural condition to two horses, but after the third day they could scarcely be induced to eat it. On the fifth day one of the horses had slight salivation, occasional colicky pain and diarrhea, and on the seventh day there were some incoördination of movement and stupor, but recovery followed without any skin manifestation. The result of Bitting's experiments shows that inoculations with cultures of the fusarium were infective, while the eating of mashes containing the fusarium in pure culture produced a stomatitis, and the feeding of the mouldy corn itself caused a dietetic disturbance and some nervous symptoms.

Hart, working in the pathological laboratory of the Bureau of Animal Industry, has recently isolated from a peculiar skin lesion in a hog, a culture of fusarium which conforms morphologically and culturally to the fungus here described. The carcas was one of a number of hogs killed in a local slaughter house, all of which showed the same condition of the skin of the belly.

The specimen brought to the laboratory showed perfectly round patches from a dime to a quarter of a dollar in size with a hyperemic periphery and a dull gray centre. The areas were sharply defined from the healthy skin, and the condition was thought to be ringworm, the superficial dry crusts having been removed during the scalding and scraping process.

Sections were made from the affected areas but neither spores nor mycelia of either the trichophyton or fusarium were found in the tissue by this method of examination, although media inoculated with material obtained on a platinum needle after searing and incising the surface of a lesion, produced a growth of fusarium.

HISTORY.

The dermatomycoses of the horses heretofore described have only included the three diseases produced respectively by the Achorion Schönleinii (favus), trichophyton tonsurans (ringworm) and microsporon Adouini (parasitic pityriasis) which Megnin has described on the surface of the skin in which the hair follicles showed a mass of mycelia and spores of this microsporon. To the non-professional observer these various fungous diseases are grouped with most of the other skin affections under the general term of "mange," and the treatment of these widely different disorders is usually the same. The existence of another cryptogam as a parasite in the skin of the horse makes it of additional importance to understand thoroughly the character of these different cutaneous affections in order that the appropriate treatment of each may be recommended. These three dermatomycoses are all produced by the lower fungi consisting of simple filaments which develop bud-like growths called conidia. The fusarium, however, belongs to the more highly organized fungi and is distinguished from the former by the possession of segmented mycelium and by the formation of spores in the interior of a specialized cell called an ascus. Contagion probably takes place as a result of actual contact with an affected animal, or by means of fences, posts, trees, stables, corrals, or by litter, grass, forage, etc., where the fungus is living saprophytically. The fact that the fusarium was leading a parasitic life on the skin of horses does not preclude its saprophytic origin from vegetable or inert matter where it may exist naturally, develop, reproduce and contaminate the skin of the horses through contact with such infected vegetable or inert material. Indeed there are logical reasons for considering this method of infection, the actual way of its spread, inasmuch as actinomycosis and aspergillosis are known to live on vegetable matter, by which they are brought into contact with animal tissue which subsequently becomes parasitized by these fungi. Furthermore, fusarium fungi are known to produce the disease known as wilt on cowpeas, watermelons, tobacco, cotton, and have been found on corn, rye, grass and other forage crops, so that the possibility of the horses becoming directly infected by means of the vegetation affected with fusarium must be considered as a plausible possibility. Furthermore, the fusarium is peculiarly an organism of the soil and its dissemination is widespread.

It is rather difficult to trace the history of this horse disease on the Reservation or to determine the distribution of the affection in the adjacent country. It is supposed that a band of horses from California which were trailed through that section in 1892 brought the infection. Since then the disease has gradually increased yearly until it reached its heighth in 1901 and 1902, when it was spreading so rapidly not only in the Reservation but to adjoining districts in Oregon and Washington, that the stockmen of that locality became very much alarmed, and stated that unless the disease was eradicated all the horses of that section would become infected. This spreading of the disease was probably aided by the free movement of the Indians between the Umatilla Reservation and the various Washington reservations, as well as by the custom of the Umatilla Indians of going on long hunting trips to the mountains each spring for fish and game.

SYMPTOMS AND LESIONS.

The presence of the sarcoptes scabei in the skin of a number of the horses affected with this skin disease makes it difficult to determine what symptoms are caused by this animal parasite and what should be ascribed to the fungus. However, a number of hides were examined in which no sarcoptes could be found, and in those skins where sarcoptes were observed the lesions were out of all proportion to the small number of these parasites, while in all cases spores and mycelia of the fusarium were readily observed. Whether the sarcoptes offered an opportunity for the subsequent infestation with the fungus was impossible to determine, nor could it be ascertained whether the sarcoptic parasites themselves carried the fungus into the derm which later resulted in the appearance of the dermatomycosis. From a microscopic examination of the early cases of this skin disease it would appear that the fungus enters the hair follicles, penetrates between the cells of the epidermis or an abrasion of the skin, and involves the surrounding cuticle, determining a greater or lesser degree of irritation. This is followed by pruritis, the animal attempting to rub itself against anything with which it may come in contact; it bites itself wherever it can reach and enjoys being scratched with the fingers. It is not an infrequent sight to see two animals headed in opposite directions nibbling at the affected parts of one another. The pruritis seems to be greater during the day than at night, and in the warm season than during cold weather. The hair in isolated areas appears to stand erect, and by passing the hand over the surrounding cuticle slight elevations are felt which are formed by a little scurf around two or three hairs. When this scurf is rubbed off by the finger nail there is left in its place a red, moist denuded surface. In the early stages these areas are well scattered, but they increase in diameter and thickness and finally coalesce, forming large dry patches and thick crusts from which the hair, after becoming brittle and broken, almost entirely disappears. It spreads rapidly and affects almost the entire body except below the knees and hocks. In these cases the hair nearly all comes out and the tumefied skin will lay in wrinkles covered with crust or scabs, sometimes becoming fissured with superficial cracks. The crusts are of a gray color at first but turn darker as they grow older and give off the usual odor of dead skin. When the tissue is examined microscopically the spores are seen to be by far the more numerous, especially abundant in the hair follicle, although mycelial threads are not infrequently seen. This results in changes in the hair follicle which is followed by an atrophy of the papillæ and the dropping out of the hair. The true skin or derm, as the result of irritation consequent upon the presence of a foreign body, becomes thickened by an hypertrophy of the fibrous tissue elements and the cuticle becomes harsh and unwieldly. The inflammatory process spreads to the sebaceous glands, causing a suppression of their excretion, with the resultant formation of epidermal crusts and scabs. Owing to the vast numbers of sensory nerve endings in the skin, there is much pruritis and more or less pain resulting from this hypertrophy of fibrous tissue and swelling of the skin.

The fact that no Sarcoptes were present in some specimens would indicate that the dermatitis was caused principally by the fungus, although undoubtedly the animal parasites may aggravate the disease to a considerable extent and make it more difficult to treat and eradicate. The few sarcoptic parasites found complicating the fungi were not in proportion to the extent of the lesions, and despite the fact that careful examination ,was made in all the specimens for scab mites, eggs, shells or galleries, and that all the samples were warmed and kept under the best conditions for examination, the presence of the mite was only observed in a small percentage of the cases, and lice also were infrequently noticed, while the fungus was invariably found. That the fusarium was not existing as a simple saprophyte upon dead cuticle was manifested by the histological study of the skin after staining with borax blue and eosin, hematoxylin and eosin, Gram's and similar stains, which showed that the fungus was deep-seated, and was acting as a foreign body invading normal tissue and producing irritation with consequent pruritis.

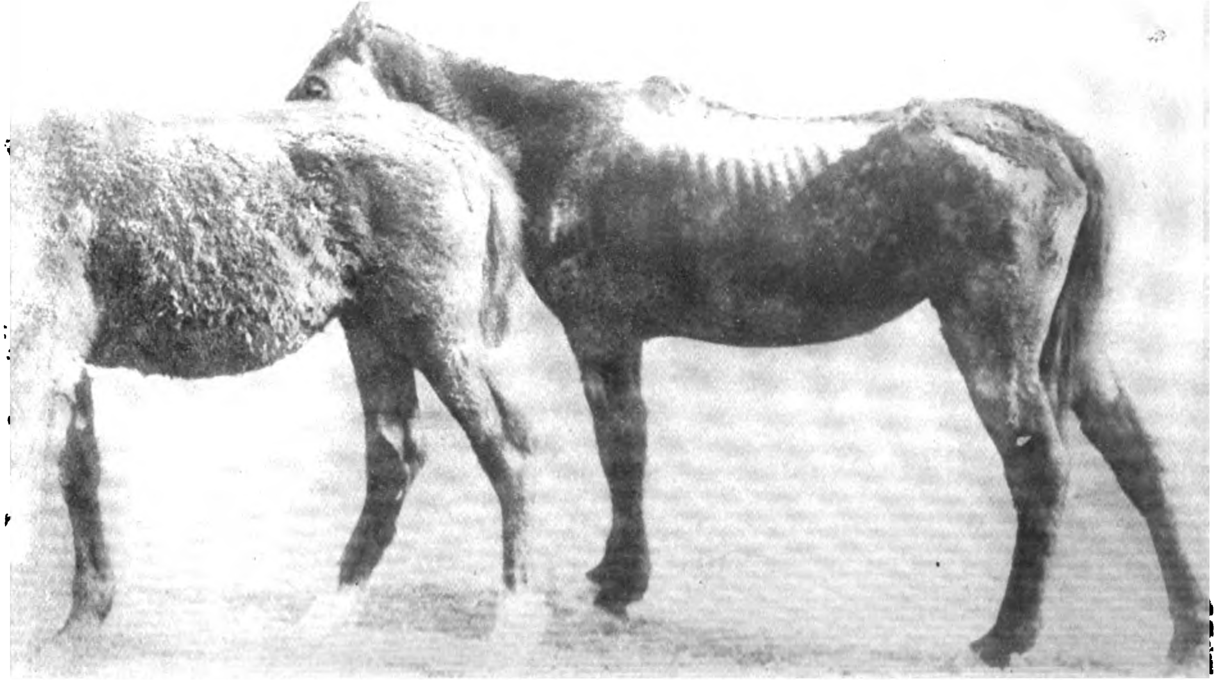
The exact point and mode of entrance of the fungus are not accurately known, but the spores and scanty mycelia are found in the hair follicles, sebaceous glands, and in the scales on the surface of the skin. The secondary inflammation of the surrounding tissue is usually more severe than in sarcoptic mange, and is probably due to a toxin produced by the fungus. The lesions occur on various parts of the body, some on the neck, sides, external surface of the hind and fore legs, on the scrotal integument, and at times over all portions of the body except the lower parts of the legs. All ages and breeds of horses seem equally susceptible as are both sexes, but there is considerable difference in the susceptibility of well and poorly nourished animals since weak, impoverished, unclean and neglected horses are more frequently attacked than horses in better condition. The animals stand around the rubbing-posts all day indifferent about eating, and finally become anemic and debilitated to such an extent that they die.

MORPHOLOGY OF THE FUNGUS.

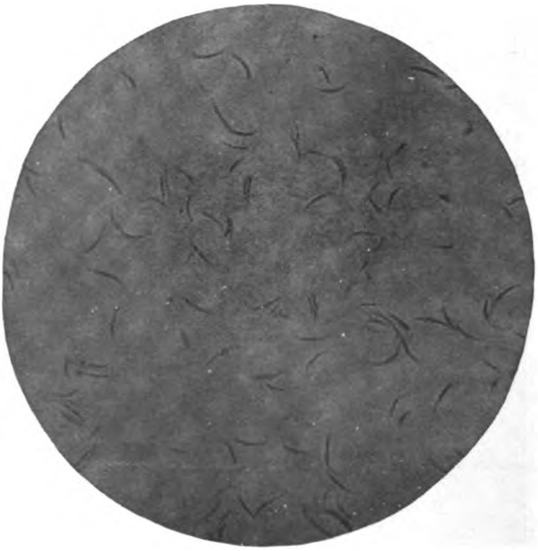
With the view of studying the development and form of the fusarium, hanging-drop preparations were made with some spores suspended in a bouillon medium on a cover glass inverted over a cavity in a glass slide. Careful examinations of the preparations were conducted for periods of 5 or 6 successive hours and the various growths were reproduced by camera lucida drawings. In from 3 to 10 hours after transplanting the spores, they would commence to germinate and the mycelia which grew rapidly would within 24 hours produce microconidia. It might be well to mention at this time that the fusarium possesses three forms of spores or conidial fruits. One form is the microconidia, which are small, oval, non-septate, colorless spores produced inside the living plant, either on aerial mycelia or on hyphæ, which lie close to the substrata. They are mostly unicellular but not infrequently consist of two cells and vary from six to fifteen microns in length, and three to five microns in width. The plasma of these conidia is very finely granular and is frequently vacuolated. The cell membrane is thin and hyalin. The second form of spore is the macroconidia, which are large, falcate conidia with sharp lanceolated ends, three to five septate, the fruit being borne in great numbers on pure white or salmon-pink colored conidia beds. The single cells between the septa are somewhat ventriculous, so that these conidia may appear slightly constricted at the dividing walls. The two end cells are about one and a half times as long as those in between. Contrary to the microconidia these spores appear to form only on aerial mycelia and drop down immediately after separation. They are external, lunulate, sharp-pointed spores from 25 to 55 microns long and 2½ to 4½ microns wide. The establishment of the genus fusarium is dependent upon the typical shape of this second fruit form.

The third form of conidial fruit is the chlamydospores, which are oval or oblong, thin walled, densely granular spores from 8 to 15 microns in diameter. Only a few of these spores were observed in any of the cultures of the fungus and then only in the older substrata.

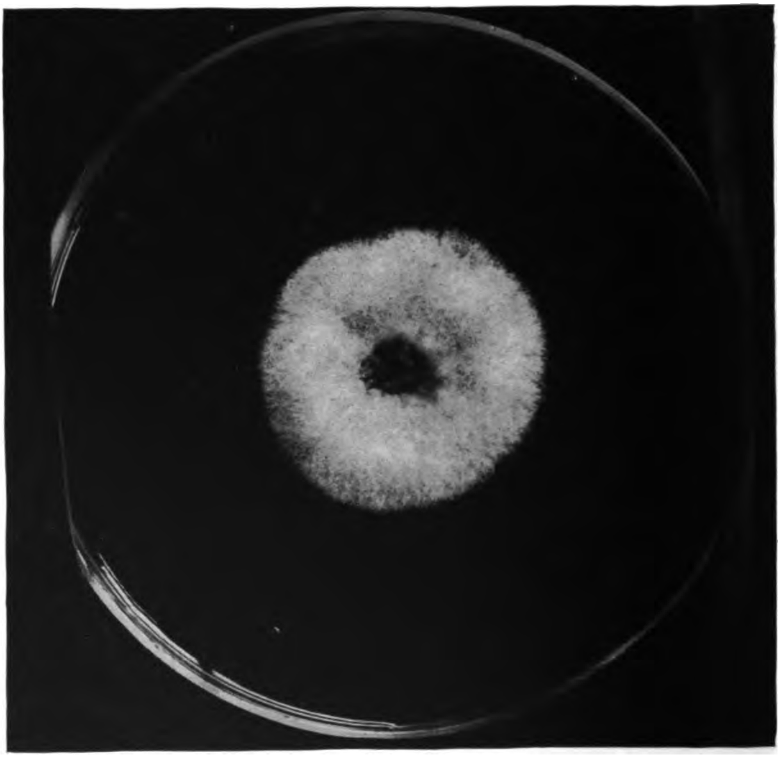
Microconidia are produced during the most active growth of the fungus, while the falcate, multiple-celled spores are probably a resting stage and occur when the nutrition of the fungus is becoming diminished. Both of these forms of conidia produce mycelia in about the same length of time. The macroconidia germinate frequently from both terminal cells, occasionally also from one of the intervening segments. Generally, however, only two of the cells germinate, rarely three, and the remaining cells retain for a long time their granular appearance. The mycelia usually grow rapidly in length and septa are formed in them. These filaments, in some cases, become quite long before spore



Mare and colt affected with dermal mycosis.



Crescentic, segmented spores of Fusarium equinum.



Colony of the fungus on plate agar.

formation begins, while in other cases the mycelia begin to fruit in a very little time, the filament as a result being quite short. Microconidia may in this manner be produced from mycelia germinating from macroconidia, or the reverse may take place. By such methods of reproduction there is formed in three or four days upon the surface of culture media a white or slightly colored frost-like film composed of branching articulated filaments. The crossing and ramifying hyphæ soon send up many colorless, vertical, vacuolate branches in which partitions or septa form at more or less regular intervals. The cells thus formed are oblong and cylindrical, except the terminal one, which thickens and assumes an oval form. The partition which separates it from the other cells of the filament gradually causes its abstriction, and it readily falls off as a microconidia, to be followed by others, one after another. The spores then commence to germinate in a very short time by pushing out a germinating tube which first appears as a slight swelling following the polar accumulation of the cell plasma and the thinning of the cell membrane. The first protrusion of this germinating tube is noticeable in about five hours in the hanging-drop. It may break out from any side of the spore, but usually develops at right angles to the long axis of the conidia. Sometimes two germinating tubes leave the same microconidia, which then soon become vacuolated. The segmentation and ramification of the young mycelial threads gradually follow but require about twenty-four hours. The first septum is found close to the conidia, and the first ramification is likewise near to the basal end of the young filament. After the hypha end abstricts several conidia, it enters upon vegetative growth by elongation and formation of partitions, but later it may cease to vegetate and again form spores.

Perithecia were not observed on any of the culture media used, although numerous attempts were made to see if they could not be produced on various substrata.

CULTURAL CHARACTERISTICS OF THE FUNGUS.

In order to ascertain the characteristics and variability of growth of the fungus, a large assortment of substrata were used. On plain slant agar the growth is slight, spreads slowly and remains in a thin layer over the surface of slant.

In glucose and saccharose agar the growth is much more rapid and the stroma becomes wrinkled and dense after several days. The latter seems to be the more favorable medium, and the fungus takes hold quickly and spreads rapidly until the whole length of the slant is covered with a thick, wrinkled growth within four or five days after inoculation.

On plate agar the growth on the third day appears in the form of pure white colonies from 3 mm. to 1 cm. in diameter, with edges ciliated and the fine mycelia extending 3 or 4 mm. above the surface of the media. In the agar tubes the growths remained pure white on the surface as long as they were under observation (10 or 12 weeks), but the deep surface of the growth on plate agar, as well as in the slant agar tubes, became of a salmon-pink color.

On agar containing 2 c.c. of litmus solution and a few drops of saturated solution of sodium carbonate the spores failed to propagate, and after two weeks the media became contaminated with pencillium and was discarded.

On plain potato broth the growth was well marked at both the surface and in the depth of the media, and on agitation the deep growth scattered in the form of small flocculi through the liquid.

Three tubes of potato broth containing 1 c.c. of a tenth normal solution of citric, tartaric and oxalic acids respectively, were also inoculated with the fungus, in all of which the growth was well marked, appearing at both the surface of the liquid and in the base of the tube. The outer face of the surface growth in all cases remained pure white, extending completely across the liquid and so compact that the tubes could be inverted and the liquid broth remain at the base of the tube, held in place by the compact moisture proof mycelia. The inner face of the growth, or that part in contact with the underlying liquid, became of a dark brown or chocolate color about fourteen days after inoculation.

On Dunham's solution the growth was most marked, appearing at the surface, and finally extending completely across the tube. About fourteen days after inoculation the fluid assumed a distinct yellowish cast which increased until it became of a dark yellow and the surface of the growth near the media assumed a dark chocolate color.

On Dunham's solution, containing 2 per cent. cane sugar and 1 per cent. sodium carbonate solution, four days elapsed after inoculation before any growth appeared. It then continued slowly to increase, and finally, after about eight weeks, had reached the surface of the liquid, which later had assumed a very light lemon yellow color.

Two other Dunham's tubes, one containing 1 per cent. oxalic acid and the other containing 1 per cent. oxalic acid and 2 per cent. cane sugar, were also inoculated at the same time, August 4th. On August 11th, having shown no growth, they were reinoculated and incubated for several weeks, but the fungus failed to multiply and they were finally discarded after eight weeks of incubation.

The most favorable substrata used were potato and bread steamed in distilled water.

On potato the growth was unusually rapid, appearing in the form of a luxurious fur-like, prominently raised growth covering the potato slant in three or four days. Spore formation was extremely abundant in this media, the characteristic crescent-shaped segmented spores appearing in enormous numbers about the fifth day after inoculation. After about ten days the entire surface of the potato was completely enveloped in the pure white growth.

On bread saturated with distilled water the growth was also very abundant, and in five days had covered the surface of the media. It continued to increase and became wrinkled. In ten days the bread had crumbled and sunk to the bottom of the tube, and the growth being fully 12 mm. in thickness, floated on the surface of the water which later assumed a yellowish cast.

On bouillon the growth was about the same as on the other liquid substrata. Growth appeared in the depth of the liquid and sent mycelial strands up the sides of the tubes for a distance of 25 mm. above the surface of the media. The bouillon remained clear and there was no change of color.

The fusarium was also grown on acid and neutral gelatine in the form of stab cultures. The tubes were placed in the ice chest and it grew equally well but feebly on the one as the other. The surface of the gelatine became covered with the fungus, and in five days arborescent spur-like growths appeared along the line of the stab in the form of isolated areas about the size of a pea in circumference. After about four weeks the gelatine began to liquify directly under the surface growths and the liquified portions assumed a light brown color. Liquefaction, however, was extremely slow, and after the cultures had been under observation for ten weeks, it did not extend more than half-way down the stab.

A series of nine rice tubes were also inoculated with the fungus.

1. Uncooked rice in distilled water.
2. Rice containing 10 drops of ½ per cent. hydrochloric acid solution.
3. Rice containing 2 drops saturated solution of sodium carbonate.
4. Rice with 5 drops of ½ per cent. solution of hydrochloric acid.
5. Rice with 2 c.c. litmus and 2 drops saturated sodium carbonate solution.
6. Rice with 5 c.c. saturated solution of sodium bicarbonate.
7. Rice with 8 drops saturated solution sodium carbonate.
8. Rice containing 2 c.c. litmus.
9. Rice plus ½ per cent. hydrochloric acid solution sufficient to moisten the medium.

Of these nine tubes only the latter four showed any growth, and the remaining five were discarded after being kept in the incubator for several weeks. Rice does not seem to be a favorable substrata, and the fungus remained dormant in these latter four tubes from fourteen to thirty days before any apparent growth was observed. However, after it started these tubes grew steadily until, two months after inoculation, the surface of the rice in tubes Nos. 6 and 7 was covered with the white mycelia and it was boring its way down between the interstices of the rice grains. In No. 8 the aerial mycelia were pure white but the growth below had assumed a beautiful purplish pink coloration, while in No. 9 the substratum was of a reddish tinge which gradually faded to a pink on approaching the surface which was white.

Blood serum also furnished a good nutritive media for its growth. The slanted surface of the solidified serum became covered with a thin white growth within four days after inoculation. The action of the fungus on the serum substrata was peculiar. It produced a gradual softening of the serum, first affecting the slant which when the tubes were kept in a perpendicular position slid down until finally the growth was only separated from the side of the tube by the merest layer of serum. Finally all of the serum in the base of the tube showed the same softening, and if the tube were inverted the thus softened media would slowly flow toward the mouth of the tube.

In order to ascertain the reaction of the cultures of the fungus grown for a varying number of days, three sets of bouillon tubes were inoculated. The reactions of these tubes were as follows:

Four tubes reaction .6 alkaline, to the phenolphthaline test; 4 tubes reaction 11.5 alkaline, to the phenolphthaline test; 4 tubes reaction .3 acid, to the phenolphthaline test.

After the lapse of forty-eight hours one of each set was titred. The .6 alkaline tube at this time had changed to .8 acid, showing that 1.4 per cent. acid was produced in two days.

The 11.5 alkaline tube had changed to 6.5 alkaline, therefore 5 per cent. acid must have been formed. The .3 acid tube had increased its acidity to 1.2 per cent., showing that .9 acid had been produced.

Four days after inoclulation one more tube of each set was titred. At this time the reaction of the .6 alkaline had changed to 1 per cent. acid, showing that 1.6 per cent. acid had been produced in four days and .2 per cent. acid in the last two days. The 11.5 alkaline tube now showed a reaction of 3.6 alkaline, therefore 7.9 per cent. acid had been formed in four days and 2.9 per cent. in the last two days. The .3 acid tube now showed a reaction of .88 per cent. acid, and therefore .58 per cent. acid had been produced in four days, but the acidity had been reduced 0.14 per cent. in the last two days.

The production of acid is therefore greatest during the first two days.

On July 14, six days after inoculation, one more tube of each set was tested. The .3 acid tube now showed an acidity of .5, and, therefore, its acidity seemed to be gradually declining.

The .6 alkaline had changed to .5 acid, which indicated that its acidity was also gradually being reduced.

The 11.5 alkaline tube now produced a reaction of 2. alkaline, showing that this was the only tube in which acid production was continuing.

On July 19th, twelve days after inoculation, the last tube of each set was titred.

At this time the 11.5 alkaline again gave a reaction of 2. per cent., which shows that it had remained stationery in reaction during the last six days.

The .6 alkaline tube had a reaction of .33 alkaline, indicating that its acidity had been reduced during the last five days from .5 acid to .33 alkaline.

The .3 acid tube at this time registered .55 alkaline, showing that its acidity had fallen off since October 14th from .5 acid to .55 alkaline.

From the above experiments it will be seen that the fusarium produced acid rapidly during the first two days after inoculation. During the following two days acid production, although still continuing, was less marked than during the previous two days. At the end of six days the only tube still producing acid was the excessively alkaline one, in the remaining two the acidity being on the decrease. After this the 11.5 alkaline tube remained stationary, and by the eleventh day the acidity of the other two tubes had been very much decreased.

SUMMARY OF THE GROWTH OF FUSARIUM.

The growth of this fungus remained pure white on all media except plain Dunham's solution, where the lower surface of the growth next to the liquid was chocolate in color, but the portion of the growth projecting above the liquid was pure white; on agar where during a part of the time the growth was of salmon pink color but later returned to white; and, on litmus and acid rice where the substrata became purplish pink and reddish pink respectively. The fungus does not seem to grow at all, or at most, very poorly on Dunham's solution, especially Dunham's solution containing oxalic acid. On plain agar, glucose and saccharose agar a growth was well marked, it being the most rapid on saccharose and least on plain agar. No appreciable difference was noted in rapidity of growth whether on 2 per cent. or 10 per cent. saccharose agar, or 2 per cent. or 10 per cent. glucose agar. It can be easily grown on potato broth, and grows both on the surface of the fluid and in the depth. The growth continued to increase most steadily when on potato broth plus 1 c.c. of one-tenth normal solution of oxalic acid solution. Potato was an extremely favorable culture medium, and growth remained pure white after two months. Bread was also a very satisfactory medium, and growth became very dense and wrinkled within a week after inoculation. Rice did not form such a good medium as those described above. On this substance the fusarium may remain dormant for a very long time after inoculation and then suddenly start and grow exceedingly rapid. One tube of rice made blue with 2 c.c. of litmus solution was inoculated on August 5th. It remained in the incubator without any sign of growth until August 30th, when it increased very rapidly, entirely covering the surface of the rice and extending for an inch down below the surface. The color of the growth was white on the surface, but became purplish pink in the substrata. Another culture of rice, plus one-half per cent. of hydrochloric acid, remained dormant from August 5th to August 18th, when a slight growth could be observed. It increased very slowly up until August 29th, when it suddenly started, covering the whole surface of the rice and extended below for a distance of an inch, producing a beautiful reddish pink coloration of the substrata which gradually faded to a pure white of the aerial mycelia. That this coloration of the hyphæ was due to the character and acidity of the media was shown by transplants on potato which resulted in the production of pure white colonies. When sown upon the slanted surface of solidified blood serum or in gelatine the peptonizing effects of the fungus became apparent through the liquefaction of both these varieties of culture media.

EXPERIMENTS ON TRANSMISSION.

After obtaining the fusarium in pure culture, attempts were made to infect guinea pigs and rabbits both by feeding the fungus and by rubbing pure cultures into the scarified surface of the epiderm after shaving the hair, but with negative results. Several rabbits were likewise exposed by cutting off the hair from the back, scarifying the derm and sewing a piece of the diseased hide to the exposed surface, but without result. In fact, all our attempts in reproducing the disease were attended by the same negative findings. Dogs were fed the cultures and treated on and under the skin with the affected hide and cultures of the fungus, but without avail. As the most important experiments consist in the attempts to reproduce the disease in horses, a more detailed description of the methods employed will be given.

Three horses were used in this series of tests at various times during the investigation. Horse No. 1 was prepared by shaving several large areas on the back, on either side of the spine near the withers. The skin was disinfected with alcohol, carbolic acid, and sterile water, and then scarified quite extensively with a sterile scapel. After the blood had been drawn from numerous punctures, cultures of the fusarium were rubbed into the skin. Twice daily a spray of sterile water was sprinkled over the surface to furnish sufficient moisture for mould development. When these attempts proved futile, similar areas were prepared, and the scabby surface of a sample of affected horse hide was rubbed on the punctured skin and then fastened to the animal, but with the same result as before.

At a subsequent time Horse No. 2 was prepared by treating the skin as for Horse No. 1. Cultures of Fusarium equinum were thereupon rubbed into the parts and a large wad of absorbent cotton was placed over each treated surface and kept moistened by spraying with an atomizer at frequent intervals during the day. With this heat and moisture and an occasional addition of the fungus culture to the skin, it was thought that the most favorable conditions in nature were being met, but infection failed to take place.

Horse No. 3 was injected intravenously with 5 c.c. of a bouillon culture rich in spores, but from which the mycelia had been strained. The animal remained healthy. This horse was subsequently fed every day for ten days with the full growth of the fungus on a petri dish 100 mm. in diameter containing agar. These feedings were not effective in reproducing the disease, although the feeding experiments of hogs conducted by Peters with Fusarium monoliforme resulted in the animals losing their hair as in the original disease, while Bitting produced reddening of the gums, salivation and intestinal disorder by feeding a similar fusarium to horses. Thinking that probably the sarcoptes parasites might play an important rôle as carriers of the fungus, a small number (eight) were obtained from a Virginia horse and allowed to remain for several hours in a potato tube of the culture rich in spores. They were thereupon placed on the back of Horse No. 3, but without producing a lesion of any kind. It is very difficult to furnish an explanation for these various failures to reproduce the disease, especially to cause sarcoptic mange in the last experiment. The animals were all in good condition, well fed and kept in a clean sanitary stable without grooming. However, it is well known that some fungi require to be in a certain stage of development and to be placed in a particularly favorable environment before their pathogenic effects will be noticeable. No better illustration of this is required than the usual negative results which follow the inoculation experiments with the ray fungus, actinomyces. Moreover, similar negative results followed the inoculation experiments of Tokishige, and Fermi and Aruch with the saccharomyces farciminosus, the accepted cause of pseudo-farcy of horses. This failure to reproduce diseases with fungi, which are known to be the causal factors, may be due, according to the acceptation of some mycologists, to the use of only developmental forms of the fungus, so that perhaps the natural infection occurs not directly at this but at some later stage.

METHODS OF DISSEMINATION.

The extent of this contagious skin disease among the Indian horses on the Reservation was only approximated. It was estimated that 4000 horses were on the range, all of which were either affected or exposed with possibly 50 per cent. of the total diseased. Some of these were very aggravated cases; others only slight, but gradually progressing. In addition, there were about 2000 horses used for riding or other work which were kept up in corrals or small pastures, and of these only a few were affected, as they received greater care, and when they become infected are promptly and successfully treated. As an illustration of the ways in which the disease is communicated to horses off the Reservation and to the citizens' horses, it may be mentioned that the farming portion of the Reservation is rented by white farmers who usually have quite a large number of horses. In the winter and spring the Indian range horses come out of the foothills and graze along the roads and get into the fields on the Reservation. The renters of the farms turn their horses out and they are likewise liable to come in contact with the Indians' horses, and use the same posts for rubbing and scratching themselves. Occasionally the white men's horses stray over on the Reservation and become exposed. A portion of the south side of the Reservation has been cut off, but this land has not been sold and is vacant Government land, and is also the case with considerable tracts of adjacent country. Hence the white men's horses run with some of the Indians' horses on this land. In several instances infected horses belonging to the Indians have wandered off the Reservation into Pendleton where they were taken to the City Pound, thus exposing other horses. Furthermore, there is considerable trading between the whites and Indians which has unquestionably resulted in the spread of the disease outside of the Reservation, although to what extent has not been determined. One case has been reported in which the disease was brought into a valuable herd of fifty horses through the escape of one mare to the open range on the Reservation where she ran at large for a few days. Upon being caught and replaced with the band, the disease broke out among practically all of them and thirty horses succumbed to it. It is stated that the disease has existed on the Reservation since 1892, but that nothing was done to eradicate it until 1899 when the Deputy State Veterinarian slaughtered 1000 or 1200 affected horses on the Reservation. Several years later about 500 of the diseased " scrubs " were sold to a fertilizing plant in Oregon.

Before medical treatment was undertaken to any great extent, it was quite usual for ranch men and others to shoot affected horses when found upon the open range, or to drive them over cliffs. In this way many diseased horses were disposed of.

TREATMENT.

On the Umatilla Reservation the horses are divided, as has been previously referred to, into the riding or working class of animals, which are usually kept in corrals or on small pastures, and the unbroken horses which are allowed the privilege of the range. It was in this latter class of animals that the disease made such headway, as the Indians were quick to notice the beginning of the patches on their riding horses and immediately treated them. Kerosene was first used, but more satisfactory results were obtained with the coal tar dips which finally replaced the former remedy. They mix the disinfectant by guess and apply it cold by means of a swab. When the Bureau undertook some experiments in treating this disease a dip was prepared, composed of a mixture of light dynamo oil and sulphur in the proportion of one pound of the latter to the gallon of oil. The first experiment was unsatisfactory as the rains and storms which immediately followed and continued for two months made a second application at the stated time impossible. Later this was used with good results. With the coöperation of the Interior Department, through their Indian Agent, all the worthless, affected range horses, which were found in the May round-up, were killed by the Indian police. An inspector of the Bureau was present at the round-up, and those affected horses which were not slaughtered were immediately treated by him with the above mixture. About 200 horses were rounded up in corrals each day which made this work of eradication much more systematic than is usual under range conditions. Those affected animals which the Indians wished to keep were picked out, kept in a closed pasture and treated until cured. This method of handling the disease did not apply to the 2000 riding or working horses, as these are always kept up, or are close by, and consequently what few cases become diseased were treated at once by the Indians, and as a result were generally cured.

As a rule, they used coal tar sheep dips, kerosene, or coal oil and lard, and while these remedies have not always been satisfactory, they produced cures in the majority of cases, especially the sheep dips. The Indians either roped and threw the horses and then applied the medicine, or the animals were placed in a corral containing a chute in which they were confined while the remedy was being applied to them.

REPORT OF RESOLUTIONS COMMITTEE.

By S. STEWART, Chairman; AUSTIN PETERS, J. S. ROBERTSON, W. H. LOWE, and M. C. KNOWLES.

Eradication of Cattle Fever Ticks.

Whereas, The presence of the cattle fever tick (Boöphilus annulatus) is the greatest obstacle to the development of the cattle industry of thirteen States of this country;

Whereas, The work already done shows that the eradication of this disease-conveying parasite is feasible; and

Whereas, The appropriations made by the National Congress have during the past two years accomplished much and satisfactory progress has been made; therefore, be it

Resolved, That it is the sense of this Association that the Federal appropriation for this work during the next fiscal year should be at least $500,000, and we respectfully urge that the United States Secretary of Agriculture use his best efforts to secure such an appropriation from the next Congress.

Whereas, The local committee has spared no efforts in making this forty-fourth annual meeting a success by attending to the many details in order to have as large a gathering as this properly cared for and placing every facility for their comfort at their command; therefore, be it

Resolved, That we, in convention assembled, extend our hearty thanks to each and every member of the local committee.

Resolved, That the American Veterinary Medical Association tender an expression of its appreciation of the tireless and effective efforts of the Federal veterinary inspection at Kansas City to collect, hold in reservation, and exhibit to this convention a most excellent collection of the lesions of food-producing animals; and, to the Armour Packing Company for the freedom of its plant, the courtesy of its guides and for its many successful efforts for our entertainment a tender of thanks be extended.

Resolved, That the American Veterinary Medical Association extend an expression of thanks to Parke, Davis & Co., with particular mention of the Kansas City management, for the many courtesies extended to this convention.

WHEREAS, In a number of the States men not graduates of recognized veterinary colleges are at present writing bulletins on veterinary subjects and sending them out as state publications from the state experiment stations; therefore, be it

Resolved, That the proper officer of this Association ask the Secretary of Agriculture what is his interpretation of the Hatch and Adams acts in this matter, and whether it is, in his opinion, in conformity with the Federal law.

NECROLOGY.

BY G. H. BERNS, CHAIRMAN; A. H. BAKER, W. DOUGHERTY, E. L. QUITMAN, AND J. E. RYDER.

WHEREAS, This Association, through the death of Professor Dr. John R. Thomassen, has lost one of its most highly esteemed honorary members, and the veterinary profession one of its most active workers,—Professor Thomassen was one of the faculty of the government veterinary high school of Utrecht, Holland,—

Resolved, That we express the sense of our loss by spreading this resolution on the minutes of the Association, and that a copy be forwarded to his bereaved family.

WHEREAS, It is with profound regret that we, your committee, have to announce the sudden demise of Dr. H. L. Ramacciotti on the evening of September 10th, 1907, of apoplexy, at Omaha.

The doctor was an honored member of the American Veterinary Medical Association, and an energetic and tireless worker in behalf of the upbuilding of the veterinary profession and ever on the alert to promote its welfare.

Resolved, That we extend our heartfelt sympathy to the widow and her children in their sad bereavement, and that this resolution be recorded in the minutes of the Association, and that a copy be sent to his bereaved family.

WHEREAS, In the death of Dr. Eugene Burget this Association has sustained a severe loss. Dr. Burget was born in Ohio, and died at Wadsworth, in the same state, at the age of sixty, on May 6th, 1907. He was a graduate of the American Veterinary College, class of 1884. To those who knew him best, he was a genial companion, the soul of honor and integrity, and by them his loss is keenly felt.

Resolved, That this Association express its sense of loss by spreading this resolution on its minutes, and that a copy be forwarded to his bereaved family.

A. H. BAKER,
E. L. QUITMAN,
Resolutions Committee.

REPORT OF THE ASSOCIATION OF FACULTIES.

BY C. E. COTTON, CHAIRMAN; J. J. REPP, AND G. H. BERNS.

The annual meeting of the Association of Veterinary Faculties and Examining Boards was held September 9th. Practically every State in the Union and all the colleges had representatives present.

Dr. George H. Roberts, of Indianapolis, Ind., had a very comprehensive paper, in which he advised higher entrance requirements by the colleges, setting forth that little jealousies that now exist would disappear.

Dr. Wm. Herbert Lowe, of Paterson, New Jersey, presented a paper on the "Necessity of a Broader Scope in Veterinary Education."

Dr. W. L. Williams followed with a very exhaustive paper on the "Preparatory Education of the Veterinary Student," showing the results of the defects of the students in their preliminary education, and recommending that the standard for matriculation should be a four years' course in high school or its equivalent. A graduate of a high school has sufficient knowledge of English literature to guarantee that he will be able to comprehend and properly express himself on the subjects taught.

This paper was referred to a committee appointed by the President, and they reported the following resolutions to the Association:

Resolved,

First, That this association recommend that the American Veterinary Medical Association create a Veterinary Matriculation Board to consist of three members to be appointed by the president. The members of the first board to be appointed for one, two and three years respectively, after which the president shall appoint one member annually to serve for three years.

Second, The said board shall prepare suitable questions for veterinary matriculation examinations which shall be furnished to the colleges concerned and the answers thereto returned to the board for review.

Third, The examinations by this board shall at first be limited to an ample test of the candidate's knowledge of English, which shall be increased to include other subjects from year to year, as the association may direct.

Fourth, The American Veterinary Medical Association shall not admit to its membership the alumni of veterinary colleges which fail to conform, in their admission of students, to the minimum requirements establshed by this board.

Fifth, The said board shall be authorized to establish such rules and regulations as are necessary for carrying out the provisions of these resolutions.

Sixth, This rule shall take effect January 1, 1908.

The committee was continued. and requested to work out a solution of the resolutions in detail and report at a later meeting.

The members of the Association then proceeded to a general discussion of hypothetical questions relating to reciprocity between examining boards of the different States, the requirements of the standard of education for matriculants and whether or not graduates of human medicine should be given credit for time or subjects covered in their courses of instruction.

The spirit of the members present was such that all were favorable to advancing the standard of preparatory education, but I regret to say that the feeling of the representatives of some of the schools was that if they took the initiative and the remaining schools did not fall in line, it would militate against their financial success.

Every school in the country is showing a desire to increase its standard of entrance requirements, to give a more thorough course of instruction and to be under the approbation and approval of the Association of Faculties and Examining Boards, in order that its graduates may be eligible for membership in the American Veterinary Medical Association.

REPORT OF THE ARMY LEGISLATIVE COMMITTEE.

BY J. P. TURNER, Chairman; T. E. BUDD, A. S. COOLEY, J. H. McNEIL and W. H. KELLY.

Doubtless the Army veterinarians and those greatly interested in their welfare, which really means the welfare of the entire profession, professionally and socially, are wondering what the Committee on Army Legislation of the American Veterinary Medical Association has been doing the past winter, and why it has been so silent.

The fact of the matter is, this committee has been very active and has done everything in its power to advance Army legislation, but it has not been using its ammunition when the enemy has been out of sight.

When your committee was appointed, it started the work in hand by first thoroughly analyzing " the bill to increase the efficiency of the veterinary service of the Army," remembering the old adage, " Beware of the Greeks bearing Presents."

A bill drawn and approved by the War Department on any veterinary matter pertaining to the Army will bear careful scrutiny; such is the opinion of those who have watched the constant efforts of the War Department to prevent certain very necessary Army veterinary legislation for twenty years.

To begin with, a grave suspicion arose in the minds of the committee relative to the reappointment of those veterinarians now in the service, as provided in this act.

Sec. 2, of this act prescribes for an examination as to the habits, moral character, mental and *physical* ability of veterinarians who seek appointment under this act.

Sec. 5, provides that veterinarians having fifteen years' service shall be first eligible for appointment and may be appointed without examination, and if within this description and having reached sixty-four years of age, shall be appointed and retired.

Sec. 6, provides for the men having less than fifteen years' service, who shall be appointed subject to examination as provided by this act (Sec. 2).

Sec. 8, provides that veterinarians now in the service who shall not be appointed under the provisions of this act shall be discharged from the Army with three months' pay.

In other words, it seemed clear to the committee that any veterinarian now in the Army, with less than fifteen years' service, must pass this examination as to mental and *physical* ability before he can be reappointed, and should he fail physically, he would be discharged from the Army with three months' pay.

Having been informed by an Army veterinarian that there were at least three veterinarians in the service, having less than fifteen years' service, who could not pass a physical examination on account of wounds, accidents and diseases contracted in the line of duty, it seemed of vital importance that these men, among whom are some of the brightest men in the service, should not be ruthlessly thrown out of the Army with three months' pay.

If the committee has been misinformed regarding these men, it begs leave to be corrected.

Thinking that we might have misconstrued the bill, we called upon an officer of the General Staff of the Army, who stated that our construction of the bill was correct. Then we proceeded to the Surgeon-General's office and asked whether they would pass physically, certain veterinarians of the Army, naming their alleged unsoundness (one having lost a leg in the service), and were informed that men having such physical ailments could not be passed.

The Judge Advocate-General of the Army was then interviewed, the conditions explained to him, and his opinion was:—"That any veterinarian now in the service, who had less than fifteen years' service, who did not pass the examination (including physical) as prescribed by this bill, would be discharged with three months' pay, unless the President waived such physical examination." Knowing what pressure was necessary for the latter we saw at once that an injustice was being perpetrated on the younger men in the service; men who have passed a severe mental and physical examination before their appointment and who are to-day the backbone of the service.

We then sought the aid of Congress to overcome this wrong.

Senator Warren, of Wyoming, the Chairman of the Senate Military Committee, saw at once the error of the General Staff and the injustice of this bill, but he explained how difficult such a matter was to correct on the floor of the Senate.

He stated he would do his utmost to correct the defect in this bill and would endeavor to have the following clause inserted after Sec. 6 of this bill: "If found disqualified for active service on account of wounds or disability incurred in the line of duty, their cases shall be disposed of in conformity with the requirements of Sec. 3 of the Act approved October 1, 1890" (26 Stats., Pg. 562).

He stated that the bill had very little or no chance to be considered during the present session.

Your commitee then sought the assistance of that steadfast friend of the Army veterinarian, Ex-Governor J. A. T. Hull, of Iowa, the Chairman of the House Committee on Military Affairs. He had not noticed this dereliction in the bill, as prepared by the General Staff, but readily consented to add the clause previously referred to. This clause would retire on three-fourths pay, any veterinarian, now in the service, who failed to pass the physical examination, provided that such physical disability was contracted in the line of duty. He stated to your committee that we were only wasting our time at this session of Congress, since no military legislation would be considered, save the Artillery Reorganization Bill, and on his advice we discontinued our active work at the Capitol.

His advice and prediction later proved to be correct. Several personal interviews with Captain Hull have interested him in this bill and we feel that we have in him an active and valuable helper in our undertaking.

Believing that if the clause we had insisted on having added to the bill, was endorsed by the War Department it would be more effective, the following letter was written to the Secretary of War:

February 2, 1907.

"*Hon. W. H. Taft, Secretary of War, Washington, D. C.*

"Sir:—On behalf of the American Veterinary Medical Association, I beg leave to call your attention to S. 3927, a bill 'To increase the efficiency of the veterinary service of the Army,' and to point out the injustice which would be done to several of the best veterinarians in the Army, if this bill, in its present form, became a law.

"No doubt this point was entirely overlooked by the General Staff in the preparation of this bill.

"Section 2 provides, among other qualifications, that each veterinarian shall pass a satisfactory examination as to habits, moral character, mental and *physical* ability, etc.

"Section 5 provides that veterinarians with fifteen years' services shall be first appointed without examination and if sixty-four years old and within the fifteen-year clause, shall be appointed and retired.

"Section 5 provides for the examination and appointment *after examination,* of those men with less than fifteen years' service, but makes absolutely no provision for those men with less than fifteen years' service, who may be physically disqualified before a Board of Army Surgeons for *physical* disabilities contracted in the line of duty. These men may, under this bill, pass the mental examination and those relating to moral character, professional qualifications and general fitness for the service, and no man now in the service objects to taking such an examination, but men who have served less than fifteen years, and who were required to pass a stringent *physical* and mental examination prior to appointment, object most strenuously to being thrown out of the service with three months' pay because they cannot pass the physical examination provided by this act.

"Dr. Lawrence, Veterinarian of Cavalry, lost his leg in the Philippines, by a horse falling on him, but he gallantly rides one-legged with his regiment. Dr. Hunter, Cavalry veterinarian, one of the most accomplished veterinarians in the Army, is now physically disqualified, I am informed. Dr. Gage, Artillery veterinarian, contracted amœbic dysentery in the Philippines and would probably be disqualified by this act.

"Surely, Mr. Secretary, you never meant to endorse this bill, which will dismiss, with three months' pay, some of the most accomplished veterinarians in the Army, and I am informed by prominent officers of the Army that such will be the case if this bill passes in its present shape. Senator Warren and Representative Hull were not aware of these conditions until I called their attention to this injustice, and they are now in favor of making some provisions for these men, but very much regret that it was not done by the General Staff in preparing the bill, for you well know, sir, the difficulty encountered on the floor of either house with amendments to bills.

"I beg leave to submit an amendment to Section 6 of this bill which I attach to the enclosed bills, and on behalf of the Army veterinarians and of the national body I represent, I trust you will endorse this amendment and forward the same with a favorable report to both the Military Committees. I am, sir, Very respectfully,

"J. P. Turner, V.M.D.,
"*Chairman Committee on Army Legislation,*
American Veterinary Medical Association."

His answer, which doubtless will be interesting reading to the Army veterinarians, is herewith appended. It will greatly surprise many Army veterinarians, who were stripped and required to do recruit stunts, to know that they evidently were not examined physically.

It seems strange that the War Department would accept men without knowing whether they had two legs or eyes or whether they had hemorrhoids, knowing that they were to enter the mounted service.

It may be that these physical records are missing, but we personally know that a very severe physical examination was given the first class examined, and several men were disqualified on account of physical defects, one, a student of your Chairman, was rejected physically, but was later accepted after undergoing a severe surgical operation to remove such disability. This young man will hardly agree with the Secretary of War's statement regarding a physical examination.

"WAR DEPARTMENT, WASHINGTON, February 12, 1907.

"*Dr. John P. Turner, V.S., 918 O St., N. W., Washington, D. C.*

"SIR:—I beg to acknowledge receipt of your communication of the 2nd instant, inviting my attention to Senate 3927, a bill 'To increase the efficiency of the veterinary service of the Army,' in which you point out an apparent injustice to two veterinarians of Cavalry and one of Artillery now in the service.

"In the original draft of this bill careful consideration was given in the interest of all concerned as to length of service that should act as a waiver of the examination. This length of time was determined as fifteen years. The record of Dr. Lawrence shows that he was appointed April 25, 1903; Dr. Hunter, July 25, 1900, and Dr. Gage, January 27, 1903. It will therefore be observed that their length of service falls far short of that considered proper for a waiver of examination at the time the bill was drawn. The records also show that no physical examination was required on entering the service, and it therefore cannot be known whether they were physically fit at that time or not.

"For the reasons above stated, therefore, it is not deemed wise to recommend the adoption of the amendment as proposed in your letter.

"Very truly yours,

WM. H. TAFT,
Secretary of War."

"I. F. B.

This committee has received many letters from veterinarians personally interested in this bill urging us to have it enacted into law as drawn by the General Staff. We believe, however, that we have been acting in the best interests of all concerned.

The following account of a banquet given by the "Veterinary Medical Association of the District of Columbia," May 25, 1907, may prove interesting to Army veterinarians:

"The initial banquet of the Veterinary Medical Association of the District of Columbia was held at the Hotel Dewey Saturday night. The recent legislation governing the practice of veterinary surgery in the District, and the prominent position this profession has acquired were the themes enthusiastically discussed. More than fifty members of the Association and their guests, including the Secretary of Agriculture and Representative J. A. T. Hull, were present.

"The action of the Fifty-ninth Congress in enacting the law regulating the practice of veterinary surgery in the District, restricting it to only legitimate veterinarians, and creating a board of examiners to enforce the requirements, was referred to in, most complimentary terms by the speakers. With such legislation and the support of Congress, and of such men as Secretary Wilson, who is known as a firm believer and ardent advocate of legitimate veterinary practice, the members of the Association predict a great future for the profession.

"'This law will do one thing, if nothing else,' said Dr. John P. Turner, who presided as toastmaster, in his opening remarks, 'and that is it will give the worthy practitioners their chance, and will relieve the public of frauds and quacks, thus uplifting the profession.'

"Among the other prominent guests present were Dr. Harvey W. Wiley, Chief of the Bureau of Chemistry, Department of Agriculture; Dr. William C. Woodward, health officer of the District; Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, Department of Agriculture, and Dr. Charles W. Stiles.

"In response to an introduction as 'the greatest friend of the veterinarians,' Secretary Wilson replied that he is interested as much in the cause and advancement of this profession as are the members of the Association themselves, and whatever he had done in the interest of the profession toward securing legislation had been done with a selfish motive. He had for a long time appreciated the fact, he said, that his department is in sore need of the most skilled and best educated veterinarians that can be obtained, and this was one of the ways of getting them.

"Mr. Wilson said he regretted the fact that the War Department has not done more for the profession by bettering that branch of the Army. 'I am informed,' he said, 'that many of the veterinarians of the Army are an inferior lot. This should be remedied by giving inducements to legitimate veterinarians to join. They should be commissioned and paid the same as other officers of the Army, as is done in the foreign countries.'

"Representative Hull, who is Chairman of the House Committee on Military Affairs, prompted by Secretary Wilson's uncomplimentary reference to the veterinarians of the Army, took up the cudgel in defense of the latter, and stated that the Army requires applicants for such places to be graduates from some veterinary school or else a legitimate practitioner with several years of experience, and as a result the force is able and efficient, and for its size compares favorably with that of any of the foreign nations. He admitted, however, that the veterinarians in the service should be commissioned, and ventured the opinion that it would not be difficult for the members of this Association to secure the enactment of a law authorizing it at the next session of Congress.

"Others who spoke were Dr. Wiley, Dr. Woodward, Dr. Stiles, Dr. C. B. Robinson, District Veterinarian; Dr. Melvin and Dr. Hulbert Young, President of the Association.

"The members of the Association present were: Drs. Blume, Buckingham, Turner, Collins, Young, Robinson, Rome, Melvin, Stiles, Farrington, Hungerford, Pearson, Washburn, E. S. Wolmer, M. Wolmer, Frey, Mitchell, Weeks, Yetton, Shelby, Stafford, Wootten, Summers, Linberg, Keifer, Hickman, Heidie and Turner.

In taking up the defense of the Army veterinary service, Representative Hull, Chairman of the House Committee on Military Affairs, spoke warmly in favor of the Army men, stating that, with the exception of two or three old non-graduates, who had rendered long and faithful service, the Army veterinarians were a most excellent and deserving class of officers, and plainly stated in the most frank manner that the Army men should take courage, that better days were in store for them, inasmuch as Congress intended to make them commissioned officers and would, most likely, form a veterinary corps, with a head to it.

Representative Hull further stated that such a corps, on account of its small size, could not expect very high rank at present, but that sufficient rank and promotion would be given to encourage the best men to enter and remain in the service and that their chief would be given rank commensurate with his command.

This statement by Representative Hull was received with loud and long applause.

In fact, the object of the banquet, the recent enactment of an excellent law regulating the practice of veterinary medicine in the District of Columbia, seemed to be entirely forgotten by many of the leading speakers, including Secretary Wilson and Captain Hull, as most of the remarks were on the subject of Army veterinary legislation, showing that there certainly will come some reward to our gallant *confrères* of the Army, who have so long and faithfully fought for proper recognition by Congress.

Too much stress cannot be put on Secretary Wilson's strictures on Army veterinarians since practically his entire speech was devoted to stating how interested he was in giving the veterinarians the same recognition in the Army as they had obtained in the Department of Agriculture.

The B. A. I. veterinarians present learned of the high and lofty respect and admiration Secretary Wilson had for "his boys," as he affectionately referred to them.

Your committee will always be glad to hear from Army veterinarians, who can ably assist us with much good advice.

The bill to increase the efficiency of the Army veterinary service and a report on the same is attached hereto.

SENATE BILL, 3927.

TO INCREASE THE EFFICIENCY OF THE VETERINARY SERVICE OF THE ARMY.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President be, and he is hereby, authorized to appoint veterinarians in the Army, not exceeding two for each regiment of cavalry and one for each battalion of field artillery.

SEC. 2. That, except as hereinafter provided in sections five and six, no person shall be eligible for appointment as a veterinarian who is not a citizen of the United States, unmarried, between twenty-one and twenty-seven years of age, and a graduate of a veterinary college of good standing. Nor, except as hereinafter provided in sections five and six, shall any person be appointed until he shall have passed a satisfactory examination under such regulations as may be established by the President as to habits, moral character, mental and physical ability, education, professional qualifications, and general fitness for the service.

SEC. 3. That, except as hereinafter provided in sections five, six, and seven, each of the veterinarians appointed under this Act shall have the pay and allowances of a second lieutenant, mounted: *Provided,* That after ten years' service as veterinarians, each shall have the pay and allowances of a first lieutenant, mounted: *Provided further,* That, except as hereinafter provided in sections five, six, and seven, this increase of pay and allowances shall not accrue until the veterinarian has passed a satisfactory examination as to professional, moral, and physical qualifications, under such regulations as shall be established by the President.

SEC. 4. That the veterinarians appointed under this Act shall be on the same footing as commissioned officers of the Army as to tenure of office, retirement, pensions, and increase of pay, and in all respects shall be governed by the rules and articles of war as are commissioned officers of the Army.

SEC. 5. That veterinarians now in the service who have served as veterinarians honorably and faithfully not less than fifteen years shall be first eligible for appointment under this Act and may be appointed without examination: *Provided,* That if any veterinarians falling within the description of this section shall have reached the age of sixty-four years before the date of the approval of this Act, the President may, and he is hereby, authorized to appoint and immediately retire them.

SEC. 6. That veterinarians now in the service who have served as veterinarians less than fifteen years shall be next eligible for appointment, subject to examination, as provided by this Act, and no subsequent examination shall be required for those so appointed who shall have served as veterinarians not less than ten years at date of appointment.

SEC. 7. That veterinarians now in the service who shall be appointed under this Act shall be entitled to credit for all honorable and faithful prior service in the Army as veterinarians in determining their status under the provisions of sections three, four, five, and six of this Act.

SEC. 8. That all veterinarians now in the service who shall not be appointed under the provisions of this Act, shall be discharged from the Army, by the Secretary of War, with three months' pay.

SEC. 9. That all laws or parts of laws in conflict with the provisions of this Act, be, and are hereby, repealed.

EFFICIENCY OF THE VETERINARY SERVICE OF THE ARMY.

(REPORT, TO ACCOMPANY S. 3927.)

The Committee on Military Affairs having carefully considered the bill (S. 3927) to increase the efficiency of the veterinary service of the Army, begs leave to report it back to the Senate with the recommendation that it do pass.

Competent veterinarians are indispensable in the Army, especially in the cavalry and artillery, considered from the standpoint of efficiency of the service as well as economy. Thoroughly competent and up-to-date veterinarians must be in attendance in the purchase of horses, to pass upon the health and soundness and expected endurance of the animals; and from the purchase all throughout the life and service of the animal constant care and watchfulness is necessary to prevent and cure disease—epidemic, contagious, or otherwise.

A good veterinarian can make and save for the Government many times the amount of his salary as compared with the losses through incompetency in the profession.

This branch of the service admittedly has never been upon a satisfactory basis. Some served with the relative rank, pay, and allowances of second lieutenants, while others served at $75 per month, and two of the most valuable men in the service, who served at the lowest rate, are now serving beyond the age limit usual in army retirement, one being 70 years old and the other 66.

It has been demonstrated that it is almost impossible to find men sufficiently competent to undertake the duties who will accept the pay and allowances of a second lieutenant, with no prospect of promotion, no increase of pay for foreign service, no commutation of quarters, no retirement with pay, and no pensionable status, as under the present law a veterinarian is neither a commissioned officer nor an enlisted man.

The following letter from the honorable Secretary of War, recommending the passage of this bill, gives the present situation and the changes sought through the enactment of the proposed measure:

War Department,
Washington, January 27, 1906.

Sir: I have the honor to transmit herewith a draft of a bill for the reorganization of the veterinary service of the Army.

From a memorandum prepared by the Chief of Staff it appears that the primary object of the bill is to remedy the apparently unintentional injustice of depriving the veterinarian of the benefits of the pension and retirement laws and of increase of pay for foreign service. The veterinarian is made by the law a part of the Army, but as he is neither commissioned nor enlisted he is not entitled to the benefits granted officers and enlisted men.

Another object is to attract a suitable class of men, thus keeping pace in the service with the advance of the veterinarian in civil life. Young men of good education, graduates of veterinary colleges of good standing, are needed in the service. Their duties include the instruction of young officers and enlisted men. The "horse doctor" of former days is not satisfactory as a veterinarian in the Army.

Under the present law each cavalry regiment has 2 veterinarians and 12 are authorized for the artillery corps, 42 in all. The bill provides one veterinarian for each battalion of field artillery, and as there are 13 of these battalions, the total number of veterinarians is increased by one. Should the field artillery be organized into regiments of two battalions each, the number of veterinarians to the regiment would be the same as in the cavalry.

Eight of the veterinarians now in the service have served more than fifteen years each. One has thirty-four years of service and is 70 years old; another, twenty-nine years of service and is 66 years old. The proposed measure gives just recognition for faithful service in the past as well as providing for increased efficiency in the future.

The Bill.

Qualifications for future appointments.—The applicant must be a citizens of the United States, unmarried, between 21 and 27 years of age, a graduate of a veterinary college of good standing, and must pass a satisfactory examination as to habits, moral character, mental and physical ability, education, professional qualifications, and general fitness for the service.

Advancement.—For the first ten years of his service the veterinarian is to receive the pay and allowances of a second lieutenant, mounted (the same as now). After ten years' service, and upon passing a satisfactory examination, he is to receive the pay and allowances of a first lieutenant, mounted.

Tenure of office.—The veterinarian is to be on the same footing as a commissioned officer of the Army as to tenure of office, retirement, pensions, and increase of pay.

Veterinarians now in the service.—(1) Those who have served fifteen years may be appointed without examination, and any who have so served and are more than 64 years of age may be appointed and retired.

(2) Those who have served ten years at date of appointment are to be examined only once, *i. e.,* if they pass the prescribed examination they at once have the increased pay and allowances corresponding to length of service.

(3) Any who are not appointed under the proposed measure, *i. e.,* any who fail to pass the examination, or decline to take it, are to be discharged with three months' pay.

Expense.—Should all nine of the veterinarians having more than ten years service and the additional veterinarian be appointed under the proposed bill, the increased annual expense would be $2,700. The only further expense would arise from the increased pay to which each veterinarian would become entitled after ten years' service.

In the interests of the efficiency of the veterinary service of the Army I urgently recommend this bill to your favorable consideration.

Should your committee, on the consideration of this measure, desire the presence of those officers of the General Staff who have made a special study of this subject for the further explanation of its merits, they will be instructed to report as you may desire.

Very respectfully,
WM. H. TAFT,
Secretary of War.

The CHAIRMAN, COMMITTEE ON MILITARY AFFAIRS,
United States Senate.

RESIDENT STATE SECRETARY REPORTS.

ALABAMA.

BY C. A. CARY, AUBURN.

As Resident State Secretary for Alabama, I am pleased to report that notable veterinary progress has been made in the State. For over fifteen years I have acted as state veterinarian of Alabama without a veterinary sanitary law and without a specific salary for that purpose. The legislative session of 1907 enacted a law creating the office of State Veterinarian and establishing a Live Stock Sanitary Board and defining the powers of the board and the State Veterinarian. This law gives ample power to the State Veterinarian in controlling the infectious and contagious diseases of live stock. To praise it would be too much like self-laudation. Hence, I can only say that it was printed in full in the April number of the "American Veterinary Review."

Another step taken for the good of veterinary medicine was the establishment, at the Alabama Polytechnic Institute, of a three-year course in Veterinary Medicine and Surgery, leading to the degree of Doctor of Veterinary Medicine. This is the first of its kind in the South. I apprehend that it will be a success and will meet all of the requirements of the American Veterinary Medical Association. As soon as the department "gets on its feet" the course will be extended from three to four years of nine months each.

At present we do not wish to present dress parade students or blow a high-sounding horn. But we hope to make good, and meet the competition of the good veterinary colleges.

No attempt has been made to secure a law limiting or prescribing practice in Alabama, because all approaches in that direction have developed the fact that more graduate veterinarians in the State were necessary to this devoutly desired consummation. Veterinarians in greater number must be in practice in Alabama before we can secure a law.

All eligible veterinarians have been notified of the wonderful and profitable things that come to him who belongs to the American Veterinary Medical Association. Some have heard, have knocked, and hope to enter.

The diseases that have caused most trouble in Alabama during the past year are glanders, tick-fever, blackleg, tuberculosis, swine-plague, hog-cholera, mycotic stomatitis in cattle, cow-pox, chicken-pox, and fowl-cholera. Of all of these, tick-fever brings more losses than any or many of the others. But with efficient work by the Bureau of Animal Industry and of the Alabama Live Stock Sanitary Board we hope to annihilate the cattle-tick and the disease.

COLORADO AND UTAH.

By Chas. G. Lamb, V.S., Denver, Colorado.

I am pleased to be able to report a prosperous year for the veterinarians of Colorado and Utah. These States have had a year of unusual prosperity, and veterinarians seem to have obtained a good measure of the common prosperity. The increased value of live stock of all kinds, the increase in the number of persons engaged in breeding an improved quality of live stock, combined with the really wonderful growth of our States, both urban and suburban, have been the chief factors in the increased demand for educated veterinarians. Several new men have lately entered upon practice in these States and all report a satisfactory result. If prices of live stock continue as at present and our growth continues for another year or two, there will be openings for several qualified veterinarians in our locality.

In Colorado our State Association is in very good condition, with its membership steadily increasing. We have at least two meetings a year, which are interesting and profitable to the members. We have a law regulating veterinary practice in Colorado which does a considerable amount of good, but it is of very doubtful legal strength, and we hope in the near future to improve it. During the past year we had a fight to retain even this law, as the quacks were behind a bill in the last Legislature which, if passed, would have nullified the law, but we succeeded in defeating the amendment.

The Legislature of last year passed a law giving the State Veterinarian jurisdiction and control of all slaughter houses, meat markets and all places where cattle, sheep, swine, goats or poultry are slaughtered, prepared for sale or sold, except those where Government inspection is maintained, with authority to close all places which were found to be unsanitary, and to condemn and destroy any diseased or unwholesome meat or meat food products. This law has recently gone into effect, but it has already resulted in the accomplishment of much improvement in the sanitary conditions of slaughtering establishments. Much remains to be done and much will be done along these lines in the future. The enforcement of this law has awakened the interest of several city governments to the necessity of local meat and milk inspection, with the result that some cities have passed, and others have under consideration, ordinances requiring rigid meat and milk inspection, including the tuberculin test on all dairy cows. This brought up the question of the disposition of reacting animals. It was not thought advisable to order their destruction, so the Stock Inspection Commissioners passed an order requiring the branding of all reacting animals with a perpendicular line between the eyes which would serve notice to all that the animal had reacted to the test and was considered diseased.

Utah has lately passed a law regulating veterinary practice which seems to be a most excellent one, and I would strongly urge that a State Secretary be appointed for Utah, whose report to the Association would be much more complete and valuable than any offered by a Colorado man who cannot be fully informed regarding conditions in Utah.

There will be established this year a veterinary department in connection with the Colorado Agricultural College, modeled after the veterinary department of the Iowa Agricultural College.

This department will be in charge of Dr. George H. Glover, who will associate with him a strong aggregation of professional men, and the faculty will be a most excellent one. The matriculation requirements will be high and the aim will be to place this school in the front rank of veterinary educational institutions, and I bespeak for it the endorsement of this Association.

Of contagious and infectious diseases I may say that mange among range cattle that has caused so much loss and trouble in the past has received a great deal of attention from owners, state and government authorities, with the result that while there is still some mange among the cattle of certain sections of the State, at least seventy-five per cent. of it has been eradicated, and another year ought to see it practically exterminated.

Glanders.—Isolated cases of glanders have been discovered in various parts of the State. The State Veterinarian's report shows fourteen head of horses and mules killed during the past year on account of this disease. Nothing approaching an epidemic is reported.

Sheep Scab.—United effort of the State and Government is rapidly eradicating scab from the sheep of the State. A general dipping of sheep in the infected portion of the State is now under way. About 1,500,000 sheep will probably be dipped this season, and as the percentage of scab is very small, as compared with previous years, it is hoped that this dipping will practically clean the sheep of the State of this disease.

Hogs.—We have practically no cholera in the State and are endeavoring in all possible ways to keep it out, and the only contagious or infectious disease affecting hogs is necrotic stomatitis, which has caused quite heavy losses in certain sections of the State.

CONNECTICUT.

By G. W. Loveland, M.D.C., Torrington.

There is not much of special interest to offer since my last report. In order to obtain a foundation from which to determine in the future what infectious or contagious diseases were diminishing or increasing in the State, I mailed an inquiry blank to nearly all the veterinarians and to the Commissioner on Domestic Animals, asking them to state as nearly as possible the number of such diseases that had come under their observation during the year. Replies were received from about 50 per cent. of those addressed: Rabies in man, 3; dogs, 518; horses, 13; cows, 34;

sheep, 9; glanders, 71; tuberculous animals destroyed, 500. Rabies has raged to such an extent as to compel the authorities to adopt stringent measures to suppress it. Even the Legislature became interested in the matter and passed the celebrated "Tag Act," intended, I suppose, to assist in proper identification.

The State does not recognize the tuberculin test. The Commissioner on Domestic Animals or his agents may condemn, by physical examination, paying the owner a price based upon the animal's value for fertilizer or bologna meat. This law, as a measure looking toward the control or ultimate suppression of tuberculosis, is of doubtful value, but is probably worth all it costs by encouraging the stock owners to slaughter and bury their diseased animals instead of turning them into bologna or other table delicacies.

The veterinarians throughout the State have had a prosperous year. Our Association is in a flourishing condition. The meeting at New Britain last month was one of the most successful in our history. One of the most liberal contributors to its success was Professor Williams, of Ithaca, to whom we feel much indebted. The large attendance was significant of a growing interest in the profession and in association work, and augurs well for our future.

INDIANA.

BY R. A. CRAIG, LAFAYETTE.

The veterinary profession of this State reports a very prosperous year. As has been the case for the past two years, many young veterinarians have entered practice. The law regulating the practice of veterinary medicine, which went into effect two years ago, has been of inestimable value to veterinarians and stockmen, because it has prevented non-graduates from entering practice. In the few instances where non-graduates are practicing, they do but little.

The Indiana Veterinary College is doing a good work for our commonwealth. Nearly all of the 1907 class, numbering twenty-three, have entered practice in this State.

More cases of glanders occurred during the past year than in the previous year. Most of the cases occurred during the spring months, and the outbreak was limited to a small section, and was, for this reason, more readily controlled. There has been no increase of rabies. Sheep scab has been practically stamped out.

Pleuro-pneumonia is perhaps the most serious infectious disease of horses. It is found principally in imported horses and those passing through sale stables. Investigation relative to the preventive treatment of this disease would be welcomed by horse dealers.

Tuberculosis is not a common disease in this State. There are, however, herds in which a large percentage of the animals are diseased. Judging from the few cases observed, most of the tuberculosis among dairy cattle originated from diseased animals brought from other States. Indiana is open to this source of infection. Hemorrhagic septicemia is the most common specific disease of cattle.

Among the infectious diseases of hogs, swine plague is the most prevalent. A few cases of tuberculosis in hogs have been reported. The State Veterinarian has outlined a plan of investigating the disease in hogs fed skim milk and slops from the creamery.

The condition of live stock, so far as infectious diseases are concerned, is good.

IOWA.

By G. A. Johnson, Sioux City.

The veterinary profession of this State has been favored with another year of prosperity.

Reports from various sections of the State indicate that tuberculosis continues to spread more or less, especially among swine.

Dr. R. R. Hammond, of Cherokee, Iowa, reports a well-marked case of tuberculosis in a horse.

Isolated cases of glanders and farcy are occasionally met and outbreaks of swine diseases are reported from some sections of the State. Reports indicate that periodic ophthalmia in horses is increasing. Contagious ophthalmia in cattle is more or less prevalent. A few outbreaks of cryptogamic poisoning are reported.

Recently there has been considerable agitation, in some parts of the State, relative to the establishment of municipal slaughter houses and a system of meat inspection.

While there is no question as to the need of these, it is too early to predict results.

"The powers that be" in the State of Iowa, apparently do not value veterinary science very highly, for, while it is among the courses taught at the State Agricultural College, the department is neither properly equipped nor adequately maintained. With approximately $250,000,000 worth of live stock, there is no veterinarian connected with the State Experiment Station; consequently no original investigations pertaining to veterinary science are being conducted at this institution.

Dr. A. L. Wood, of Hampton, Iowa, calls attention to the question of closer fraternizing with the medical profession, and I can do no better than to quote from the doctor's letter. "The physicians of Franklin County, Iowa, have organized an association known as the Franklin County Medical Association, which meets once a week. They take up some subject for study and spend one hour reviewing it. By invitation I have attended their meetings and find them very beneficial."

The doctor states, and I heartily agree with him, that this spirit of fraternizing should be encouraged and extended. If this were done it would result in much good to both veterinary and human medicine.

MARYLAND.

By F. H. Mackie, V.M.D., Baltimore.

The report from Maryland must largely constitute a rehash of former years, as our profession has made very few changes in the last ten years. Our law regulating the practice of veterinary medicine has undergone no changes of importance and our convictions under this law are few because we are a law abiding people. Each year brings some new members to our profession, but I am glad to say they are mostly graduates of reputable schools and men who do credit to our calling.

The past year has been quite a prosperous one for the veterinarians of this State. Despite the increase of automobiles and motor trucks the horse has increased in value, and the services of the veterinarians are more sought after than ever.

The contagious diseases are well in hand owing to the skill and diligence of Dr. Jarman, our chief veterinary inspector. Anthrax, which in former years gave us quite a bit of trouble and loss, has not, in my opinion, been heard of this season.

Equine scabies has also been wiped out. Symptomatic anthrax, limited to a very few outbreaks. Hog cholera and swine plague is confined to those shipped in by breeders. Glanders has been common but much less than a year ago. Most of it was introduced from the District of Columbia. Rabies, actinomycosis, the so-called cerebro-spinal meningitis and sheep scab have at intervals cropped out, but all have been confined to isolated cases. Tuberculosis in cattle and hogs remains the greatest menace to the health of stock and man, but sentiment and the better enacting of our laws are working wonders in its eradication.

MICHIGAN.

By George W. Dunphy, Quincy.

Authentic reports from every section of our State show the veterinarian to be well satisfied with existing conditions.

The exceedingly high prices of live stock make both breeders and owners anxious to preserve the health and sanitary conditions of their animals. Our people have discovered that the services of the veterinarian are essential in both cases, consequently the counsel and advice of the up-to-date practitioner are in constant demand, making his duties both pleasant and remunerative.

The sanitary conditions of our State are constantly improving. Our dairy inspectors are making it incumbent upon the owners of dairy herds to keep them in good sanitary surroundings. They are giving attention to ventilation and cleanliness, as well as to the general health of animals.

I regret to report that contagious diseases still exist to a considerable extent in our State, especially tuberculosis in cattle and glanders in horses. Our Live Stock Sanitary Commission seems, at times, to make heroic efforts to control these diseases. They then relax their vigilance, and allow these enemies of the live stock industry to take on new life.

Rabies has prevailed to a considerable extent. During the past year a number of persons have been bitten by rabid dogs, but owing to promptness in securing the Pasteur treatment and the efficiency of this method, no lives were lost.

After repeated efforts the veterinary profession in Michigan has succeded in getting a law enacted which gives a reasonable amount of protection to the practitioner. The empirical practitioner is still allowed to practice, provided he has been in the business for a period of five years or more.

A source of considerable satisfaction to the veterinary profession of our State is the fact that a veterinary department has been established in connection with our Agricultural College, where a thorough course in veterinary science will be given, thus enabling our young men to acquire a veterinary education in the limits of our own State that will place them well up in the ranks of the profession.

MINNESOTA.

By Charles E. Cotton, V.M.D., Minneapolis.

I am pleased to report that the affairs of the profession in Minnesota are in a better condition and on a higher plane than ever before. The practitioners throughout the State report the enjoyment of increased business, easier collections, and a more general public interest in the sanitary work undertaken by the profession, especially as regards tuberculosis and hog cholera.

The automobile has undoubtedly injured the practice of our city men to a certain extent. A large majority of our wealthy men have sold their coach horses and purchased machines, but there is a tendency during the past year for these people to keep saddle horses. A few are coming back to the coach horse, and I have no doubt but that they will all come back to the "stylish" and reliable horse. This increase in the use of the automobile has not interfered with the gradual increase in the value of horses of all descriptions. The heavy draft horse demands a higher price than ever.

In 1903, at the time our State Live Stock Sanitary Board was established and the work taken from the State Board of Health and from the control of physicians, there was some dissension in the ranks of our profession. I am glad to report, however, that the profession almost to a unit are using every effort and working hard to sustain and help in the control work undertaken by the board. At that time the board employed one secretary and executive officer, and one field veterinarian. The work has increased to such an extent that they now employ the secretary and executive officer, four field veterinarians and one bacteriologist, who is also a veterinarian.

I regret to report the loss to our State of our colleague, Dr. S. H. Ward, who so ably filled the position of secretary and executive officer of the State Live Stock Sanitary Board since its formation. Dr. Ward by his integrity, scientific skill and tact, succeeded in uniting the whole profession of the State in working harmoniously for the good of our live stock interests. The new Meat Inspection Department of the Department of Agriculture in Canada offered inducements for a larger field of work. The position of chief of this department was proffered by Dr. Rutherford to Dr. Ward and he felt compelled to accept. Dr. M. S. Whitcomb, the first assistant field veterinarian, was elected to fill the position left vacant by Dr. Ward.

We have two associations—the Minnesota State Veterinary Medical Association and the Twin City Veterinary Medical Association. The State Association holds two meetings each year. The annual meeting is held in January in St. Paul and continues for two days. The semi-annual meeting is held in July in such place as is designated at the annual meeting, and also continues for two days. Our last meeting was held in Mankato. It was well attended and every member seemed to have a special interest in the program. Dr. H. A. Tomlinson, the President of the Minnesota State Medical Society, and Superintendent of the St. Peter Asylum for the Insane, presented an interesting and very practical paper on the "Comparative Pathology of Tuberculosis." I understand from Dr. Tomlinson that the State Medical Society is contemplating making a section of comparative medicine in its society. If members of the medical profession were more frequently invited to present papers at our State and local society meetings, and if we would take advantage of the opportunities presented to us to attend and take part in the meetings of the medical societies, it would certainly hasten the day when we, as a profession, will be placed on a level with our sister profession, and our work be recognized by the public as necessary to the general health of the human family.

The Twin City Veterinary Medical Association meets each month alternately in Minneapolis and St. Paul. This is somewhat on the order of a mutual admiration society. It was organized three years ago to promote a more fraternal feeling among the members of the profession in the two cities. The members of the Bureau of Animal Industry at South St. Paul take an active interest in the proceedings. One or two papers are read at each meeting, the remainder of the time being taken up by an informal discussion. Twice a year we have a social meeting to which the ladies are invited.

During the session of our Legislature last winter, after much effort, we succeeded in having a bill passed which we think one of the best, if not the strongest acts regulating the practice of veterinary medicine and surgery. The principal change is the renewal clause requiring each registered veterinarian to pay the Board of Examiners a renewal fee of one dollar annually. The board may refuse or revoke a certificate of renewal which has been obtained by fraud, or when the holder is guilty of gross moral or professional misconduct. This gives the board more money to carry out the provisions of the act, and places it where it can prevent the practicing of many unqualified persons who succeeded in registering under some of the former acts.

The State Live Stock Sanitary Board succeeded in having a bill passed appropriating sixty thousand dollars to pay the claims that had accrued for the payment of animals destroyed by the board for glanders and tuberculosis. In the Omnibus bill, the board was allowed thirty-five thousand dollars annually for the next two years, for the payment of animals destroyed for glanders and tuberculosis. This, with the present annual appropriation of nineteen thousand dollars, places the board in a better position to continue their control work than ever before.

A bill was also passed making it a gross misdemeanor for any transportation company to bring into the State any animals for breeding, dairy, or feeding purposes without a certificate of health from a qualified veterinarian. We had such a bill before, but the offense was named simply a misdemeanor, and a number of the railroad companies were inclined to ignore it. Since this act has gone into effect, with a fine of not less than five hundred dollars, or more than one thousand dollars for each offense, the companies are very careful and will not release an animal until they get a certificate of health from a qualified veterinarian.

We were also successful in obtaining a bill regulating the public service of stallions, requiring the registration of all stallions used for public service with the Registration Board. This board is composed ex-officio of the Professor of Animal Husbandry of the Minnesota College of Agriculture, the Veterinarian of the State Experiment Station and the President of the Minnesota Horse Breeder's Association. The duty of the board is to verify and register pedigrees, to pass upon certificates of veterinary examinations and to issue stallion certificates. Before an owner can secure the license certificate he must present to the board a certificate and affidavit from a qualified, licensed and reputable veterinarian to the effect that he has personally examined such a stallion and that to the best of his knowledge and belief said stallion is free from infections, contagious or transmissible disease or unsoundness. The owner of a stallion must also furnish a stud book registry certificate of pedigree of the stallion.

The presence of any one or more of the following diseases disqualifies a stallion from public service, and the board is authorized to refuse a license certificate to any stallion found to be affected, viz.: cataract, amaurosis, laryngeal hemiplegia (roaring or whistling), chorea (St. Vitus dance), crampness, shivering, string-halt), bone-spavin, ringbone, sidebone, glanders, farcy, maladie du coit, urethral gleet, mange, melanosis and curb when accompanied by a curby hock.

Contagious Diseases.—In the last year the amount paid by the State for animals killed on account of glanders and tuberculosis was $88,409.29.

Glanders.—For glanders 516 horses were killed, 90 less than were killed the year before. The closing of the public drinking fountains in the cities of Minneapolis and St. Paul has been of great assistance in preventing the spread of glanders. During the past year less than one-half as many horses have been killed in these two cities on account of glanders as in the previous year.

The work in our State for the past ten years will support me in the following statements: Ninety per cent. of the animals once giving a typical reaction to mallein will continue to react year after year if they are not tested oftener than each six months. Fifty per cent. of these reactors will break down and show clinical symptoms within two years. The reacting animals, although showing no clinical symptoms, at times are sources of infection. In some instances horses that have ceased to react have later broken down and been sources of infection.

Tuberculosis.—There have been 18,065 cattle tested, of which 1111 reacted and were destroyed. One thousand nine hundred and fifty-seven cattle that were imported into our State for breeding and dairy purposes were tested, 90 reacting, 54 of these were killed and the remainder returned to the point from which they were shipped. The large majority of the breeders of fancy cattle have voluntarily had their herds tested, and are very careful to buy only tested cattle. At a number of our breeders' association sales all cattle offered for sale must be tested, and some of our neighboring States require the tuberculin test on all cattle imported for breeding and dairy purposes.

For a number of years our larger cities have had ordinances requiring the tuberculin test of all cows supplying milk to their cities. Formerly they have been able to inspect only the larger dairies in the immediate vicinity of their respective cities, but during the past year they changed their ordinances, which enables them to demand a certificate of test from a qualified veterinarian, of all dairies outside the city limits. This is being rigidly enforced and has led to the testing of dairy herds in the country districts throughout the State, whose milk is shipped by rail to the large milk companies in the cities.

Hog cholera and swine plague have not been as prevalent as in former years. A serious outbreak was found covering three counties, and the disease was traced to imported hogs. A number of small outbreaks existed in several other counties, but the disease was confined to a few farms in each outbreak.

Rabies has been more prevalent during the past year than ever before. It was found necessary to require the muzzling of all dogs in townships, villages, and cities where rabies was known to exist, and also in all adjoining townships, villages, and cities.

Swamp Fever.—There have been fewer reports of cases, but the disease still continues in the northern sections of the State. Dr. Charles F. Flocken, a bacteriologist of the Bureau of Animal Industry, is with us doing research work with this disease, and we hope he will succeed in throwing some light on the cause and a solution of its control.

Malignant catarrh and cerebrospinal meningitis have not been reported.

A very few cases of **hemorrhagic septicemia, sheep scab, and blackleg** have been reported.

MISSOURI.

By J. M. Phillips, St. Louis.

The veterinary profession of Missouri has enjoyed a prosperous year. We have a state law to govern veterinary practice, but the qualified veterinarians seem too engrossed in their own affairs to molest or prosecute any of the many empirics who are still practicing. I have not heard of a single prosecution since the law was enacted a year ago. We have a State Board of Examiners, composed of three veterinarians, one of whom is the

State Veterinarian. Its duty is to qualify men to practice in our State. We have a State Board of Agriculture of which also our State Veterinarian is a member. Its duty is best explained by a report recently submitted to me by our present State Veterinarian, Dr. D. F. Luckey, to whose efforts, in the main, we owe our present practice act. He says: "The object of the department is to control and eradicate all contagious diseases of live stock. The statutes of the State give this department ample authority to place in quarantine and restrict the movement of live stock affected with any contagious disease and also place in quarantine and restrict the use of any premises of any kind which are capable of spreading any contagious disease to the extent of accomplishing the desired end.

The sources of information upon which this department works are as follows: Petitions from freeholders, notices from qualified veterinarians practicing in this State and notices from stockyard inspectors to the effect that animals affected with a contagious disease have been received.

Acting upon the information from the above sources we have been able to stamp out such diseases as glanders, sheep and cattle scabies, mange in horses, rabies, Texas fever, etc., until there are none of these left worth mentioning. There is no effort made to take official charge of outbreaks of hog cholera. The main efforts of this department, at the present time, are directed to the control of tuberculosis among cattle and hogs. For the past two years an offer has stood open to all dairymen and breeders that a veterinary examination of their herd, including the tuberculin test, will be made without any charge. This work, so far, is merely of an educational nature. The limited outbreaks of tuberculosis are used to impress upon the public the need of systematic efforts to control the disease and the necessity of a certain amount of legislation.

With this report from Dr. Luckey of the conditions throughout the State, I will mention some diseases that interest us as city veterinarians.

Glanders and farcy are quite prevalent in the south end of this city though an occasional case is discovered in the other parts. As a law abiding body of men, the members of this Association should set the example to report all cases of glanders to the proper authorities that they might know the exact state of conditions in their domain. I believe a strenuous combined effort against the disease is necessary for the interests of horse owners.

We find rabies in dogs quite prevalent.

Acute indigestion and acute gastritis have been foremost in the causes of death in former years, but are now more successfully treated by modern methods.

Septicemia from slight wounds from the ankle to the foot, resulting often in *large* gangrenous sloughing around the infected point, or *deep* when over a joint producing open joint, or when from a nail wound or corn of the feet the infection involves bone or cartilage resulting in necrosis, is very common in a city practice.

This condition was exemplified at the St. Louis meeting. Much time and expense is required to cure these cases and many deaths are due to this cause alone.

A short discussion of the cause of the disease increasing each year, and of the most successful treatment of it, would undoubtedly interest the city practitioner.

Our State Veterinary Association is in a fairly prosperous condition. Few old members drop out and new names are added to the roll at each meeting.

NEBRASKA.

By Charles A. McKim, Norfolk.

Since the last meeting of the Association, the Nebraska State Veterinary Law has been assailed twice in the State Legislature by empirics, but through the concerted and united efforts of the State Veterinary Association the law was saved as it stood. The beneficial results of its workings are beginning to be realized by the veterinarians in the State, as a result it has many more friends and supporters than it did at first. Under its provisions no person can assume or use any veterinary title or degree without passing an examination before the State Board and obtaining a license. To the present time 102 persons have passed the State Board. Of these about 88 are practicing in the State, only four of which are non-graduates.

The contagious diseases which have caused the most trouble within the State the past year are as follows: Glanders, farcy, scabies or mange in cattle, tuberculosis in cattle and swine, swamp fever or malarial fever, blackleg, ergotism, hog cholera, swine plague, rabies, contagious abortion, ano-vulvitis and hemorrhagic-septicemia.

The late Legislature increased the appropriation somewhat for the work of the State Veterinarian; it also made special appropriations as follows: $1000 for the investigation of swamp fever, $1000 for the investigation of tuberculosis in swine, and $500 for the investigation of cornstalk disease. These amounts to be expended through the State Experiment Station.

As a whole, the outlook is very encouraging for the profession in the State. The past year has been one of the best the veterinarian in private practice in the State has ever enjoyed. We think the State is one of the best in the Union for the veterinarian to choose a home.

NEVADA.

By J. O. Jacobs, Reno.

Nevada is in the limelight of the world at present on account of the wonderful mining discoveries, but its agricultural and live stock interests should not be lost sight of as they are extensive and varied.

The vast irrigation scheme of the Government in diverting the waters of the Truckee River to irrigating hundreds of thousands of acres of desert land and making them fertile, will add very materially to the stock interests.

The office of State Veterinarian was created two years ago by an act of the Legislature and Dr. I. W. O'Rourke appointed to the position, but as he was also an Inspector in the Bureau of Animal Industry up to September last, the real work for the State did not begin in earnest until the last Legislature created a State Sheep Commission to work in conjunction with the Federal forces for the eradication of sheep scab. The results so far indicate that the efforts of the Commission and Dr. H. H. Hicks of the Federal government, will prove successful.

We have isolated cases of blackleg and frequently cases of anthrax, and this summer quite an epizoötic of influenza.

Our State University has realized the necessity of enlarging its agricultural course and has established a Department of Veterinary Science and Bacteriology under the able direction of Dr. Winfred B. Mack. A strictly modern laboratory designed especially for research work has been fitted up for the study of veterinary problems. This is a valuable addition to our State and the profession at large. You will soon hear of some valuable work being accomplished at this laboratory.

NEW JERSEY.

By James T. Glennon, D.V.S., Newark.

The State Board of Veterinary Examiners of New Jersey, which came into power in 1902, has maintained a standard for proficiency for veterinarians that is elevating the profession of our State and at the same time is safeguarding the public from empiricism and quackery.

Zoötechnics, hygiene and sanitary medicine, chemistry, bacteriology, dairy and meat inspection are among the subjects in which the applicant is examined. He is also subjected to a thorough practical and clinical examination in the several branches of the profession.

The board is composed as follows: Drs. Wm. Herbert Lowe, President, Paterson; Whitfield Gray, Secretary, Newton; T. Earle Budd, Treasurer, Orange; T. B. Rogers, Woodbury; and R. W. A. English, Jersey City.

Out of the eighteen applicants who appeared at the June, 1907, examinations at the State House, Trenton, ten were duly licensed to practice, as follows: Francisco P. Boulanger, D.V.S., New York University (N. Y.-A.V.C.), Union Hill, N. J.; Ronald W. Butterworth, D.V.S., New York University (N.Y.-A.V.C.), Paterson, N. J.; Harold N. Guilfoyle, D.V.S., U. S. College of Veterinary Surgeons, Norwood, Pa.; Oliver T. Hendren, V.M.D., University of Pennsylvania, Roxborough, Philadelphia, Pa.; Wm. A. Haines, V.M.D., University of Pennsylvania, Bristol, Pa.; Lambert Rudolf Albert Iskraut, D.V.M., Royal Veterinary High School, of Hanover, Germany, Fort Lee, N. J.; Charles Labash, D.V.S., Kansas City Veterinary College, Passaic, N. J.; Walter G. Morehouse, D.V.M., New York State Veterinary College (Cornell University), Asbury Park, N. J.; Chas. C. Schloemer, V.M.D., University of Pennsylvania, New York, N. Y.; and Frank A. Wright, V.M.D., University of Pennsylvania, Mt. Holly, N. J.

Under the law of 1889 some 350 men were registered in New Jersey. The State Board of Veterinary Examiners has licensed 41 men since it came into power in 1902, making in the neighborhood of 400 legalized practitioners in the State.

Under the laws of New Jersey all Sanitary Inspectors or Boards of Health, including inspectors of foods and drugs, meat and milk inspectors, have to be licensed by the State Board of

Health. Applicants for such license have to submit to an examination by the State Board of Health as to their qualifications for the special service required.

The following veterinarians have been examined and licensed as Sanitary Inspectors of the first class by the State Board of Health: Wm. Herbert Lowe, Paterson, N. J.; Edward Rowe, Jr., Summit, N. J.; and L. E. Tuttle, Bernardsville, N. J.

As meat inspectors: G. F. Harker, Trenton, N. J.; Richard W. Hewitt, Camden, N. J.; and Willit H. Cooper, Trenton, N. J.

The attitude of the State Board of Veterinary Medical Examiners has driven unlicensed practitioners from the State.

During the year two prosecutions of illegal practitioners have been carried to a finish in our courts: Dr. Fred Eason, Englewood, N. J., was convicted and fined $100; Dr. Geo. Locke, Flemington, Hunterton County, N. J., was convicted and sentenced to sixty days' imprisonment. Other cases are now pending.

The profession of New Jersey, represented by the Veterinary Medical Association of New Jersey, has approved of Ex-President Lowe's proposition to consolidate the several State Boards and other bodies now having charge of veterinary affairs in New Jersey into one bureau under veterinary direction, such bureau not to be limited to the control of communicable animal diseases, but rather to be organized with broad enough scope to deal with all veterinary problems, whether of agricultural or public health concern.

The Association is using such means as are at its command to attract the attention of those most concerned to the benefits to be obtained by a veterinary sanitary service conducted along modern sanitary lines. Steps are being taken to obtain such legislation as may be necessary to accomplish the desired end.

PORTO RICO.

By Charles A. Allen, San Juan.

This being my first report as State Secretary of Porto Rico and as my time is well taken up, I fear that it will not prove very interesting; however, I will try and present at least a few items that may, to some, be of interest.

Taking the whole year, I believe that the climate is simply grand. We never have what is termed in the North a "bad day."

Every day is fine with the exception of pleasant, if frequently heavy, showers. Although we have it warm by times, the temperature is never so high as is frequently noted in the North. We never experience high temperature without a fine breeze which so tempers the effects of the hot sun that one has not to endure the close suffocating experiences of the North. By times when you are in a valley surrounded by high mountains or in an ill-ventilated house, you will certainly find it very depressing. During the warmest days of the year I have travelled on horseback over mountains several hundred feet above the sea level, and I assure you that I enjoyed it very much, especially, at the end of the journey, perhaps, on the side of a very high mountain and possibly on the summit, we were invited to sit down and partake of whole roasted pig, good native coffee, beans, rice, bread, and just a "leetle drap o' the native" to wash it down. Did you ever enjoy such a repast under similar circumstances? If you have, I know that you surely enjoyed it. In San Juan, the highest temperature of the year 1906 was only 94°, while the lowest was 62°. Compare this with the North, 104° down to 25°-40° below zero, with blizzards of snow engulfing everything, even the country school-house and the dear little school-marm. In some parts of the island the temperature has registered as low as 43°.

The climate is only equalled by our magnificent scenery on every part of the island,—up mountains, down into valleys, rivers, water-falls from the mountain, with here and there glimpses of the sea. At one point, at a distance of thirty-seven miles by road, you can see San Juan and the boats in the harbor on the north side, and on the south side you can see Ponce about an equal distance from the same point. This is only a five minutes' walk from your coach. I would like to say more about the climate and scenery but it would be out of place in a report of this kind.

We have seven veterinarians on the island, three of which graduated in Madrid, Spain, and all are apparently doing well.

Our legislation is defective in so far as it permits an examination, by the Superior Board of Health, for what is here called "practicantes," or second-class veterinarians. Such are, however, limited to the treatment of certain ailments. To practice as a veterinary surgeon on the island, it is necessary to obtain a license from the Superior Board of Health by either producing proof of graduation from a duly chartered college or by passing an examination. Only such graduates as above mentioned, or those who have passed a State Board examination (sic) may apply for a license.

Although quackery is practiced in a very crude and brutish form, there is a severe penalty for such, if only enforced.

I shall endeavor to secure better legislation, if possible, at the next session of the Legislative Assembly.

Our native horses are to be found in large numbers on every part of the island. They are small in size, but very large in strength and durability. Ponce is eighty miles from San Juan, the distance is made in a large heavy coach, with two horses and perhaps four passengers and considerable baggage, in twelve hours, with only three changes, and this over a mountainous country where there is not one-eighth of a mile of level road. The roads are, however, of the best formation that I have ever seen. There is not a bad spot on the eighty miles.

The horses were first introduced here from Arabia, some are very nice looking and docile, but occasionally inclined to be balky. Many times when driving through rivers (bridges are scarce), they will balk in midstream; this is not pleasant. The male animals are very seldom castrated; in fact, even the peóns (laborers) feel humiliated if compelled to ride or drive a mare or gelding. They are very pleasant to ride and the majority possess a fine single-foot action. To see the loads that those little fellows will carry over very high and steep mountains would greatly surprise you; they will carry a man weighing two hundred pounds with safety over the roughest kind of mountain paths and pick their steps with the greatest care.

Bulls and oxen are in great demand for hauling various kinds of freight and doing farm work. They are large and the majority are fine, noble-looking animals. The average load for a four-bull or ox team is four thousand pounds. They are very docile and easily handled. One thing in regard to the bulls and entire horses that is surprising is the fact that you may put a large number of either in the same pasture or stable with perfect safety. One man may take twenty horses, one tied to another, and lead them with ease, or a boy of twelve years may enter a bull pasture and lead away ten or fifteen bulls as easily as he could a pet lamb. The bulls, oxen, and cows have very large and well-formed horns. The general color very closely resembles that of the Jersey, but the sizes of the animals and horns are vastly greater.

The cows are beautiful animals, big, strong and healthy looking. It is common to see large dairy herds, varying from twenty to two hundred and fifty in each herd, all large, healthy and of the same color, so much so that one could scarcely tell one from another. Each cow must have her own calf by her side when being milked, else the milk is retained in the udder, so that if you have two hundred and fifty cows milking you must as a consequence have two hundred and fifty calves. The customers get the first milk, and sufficient is left for the calves. This, of course, is the richest milk, and as a consequence the calves are sleek and fat, while the customers go lean.

The cows are only milked once each day, and in a large herd will average from three to four quarts per day. Four quarts is a high average.

In regard to pigs I will only say that they are the best samples of razor backs that I have ever seen. American hogs appear to do well when properly taken care of. Sheep, except for mutton, are an entire failure, as the wool falls off before maturing.

Goats are very numerous, and their flesh makes a good substitute for mutton, as well as to supply the natives with milk.

Many horses, mules and cattle are being brought here from the North and appear to do well when properly taken care of.

Native horses are worth from fifty dollars to three hundred dollars; ox and bull teams from seventy-five to a hundred dollars; milk cows from forty dollars to fifty dollars. These are the average prices; some go much higher and others can be purchased for less according to age and condition.

We are still obliged to fight muermo (glanders). It is, more or less, to be found in every district on the island. As a general thing, it is the chronic form, which may run on for years without exhibiting symptoms sufficient to warrant the destruction of the animal. When the mallein or serum test is applied a reaction is the result. Although the symptoms are not developed, yet the danger of communicating the disease to, not only other horses, but also to human beings, exists and perhaps to a greater degree than from acute cases that present warning symptoms.

The principal reason why we have this low chronic form in Porto Rico is, I believe, due to the climate not being favorable to the development of muermo, and also, to the fact that muermo has existed so long in the island that horses have been bred from infected sires and dams, perhaps for generations, thereby becoming immune to the acute form, which generally prevails in the North. This condition makes the stamping out of the disease all the more difficult. It is an easy matter to find the acute case, but the tardy, chronic case is more difficult. This is why it is so necessary to make a complete and finished work of eradicating muermo, in the shortest and quickest time possible. To do it by degrees means to do it over and over again. To clean it out in one district while the adjoining district is infected simply means that in a short time the disease is again brought in by intercommunication. The only way, to my mind, to successfully eradicate glanders in Porto Rico is to do the work in as many districts as possible at the same time. This, of course, would require the temporary employment of a number of inspectors, all working under a well organized plan; a sufficient appropriation, and compensation for all animals that are destroyed and have not exhibited clinical symptoms.

If the disease was once thoroughly eradicated, I believe that it would not be difficult to keep it out, specially so, if proper precautions were taken to prevent the disease from being introduced from other places. It is practically the only contagious disease of animals that we have on the island, and if we once had it stamped out we could then claim, and I believe justly, that the live-stock of Porto Rico are more free from contagious and infectious diseases than in any other country. It would indeed be a proud boast.

I have done all in my power, and no doubt that the Inspector who is yet to be appointed for the south side will do the same. We cannot, without more assistance, do more than keep the disease under control, and endeavor to convince the owners that it is to their individual interest to assist us. We can also point out to them the great danger to healthy horses, employees, members of the families and to all persons coming in contact with infected animals, and thereby possibly prevent the death of some innocent person.

During the ten and a half months just ended I have been called to Humacao, Corozal, San Sebastián, Vega Baja and La Muda, to investigate reported outbreaks of disease in cattle.

In Humacao about twenty-five head died, but I am glad to be able to state that the deaths were not caused by a special disease, but that the cause was due to the effect of the very dry season affecting the pastures and the drinking water. The grass became so dry and coarse that it was indigestible.

In San Sebastián the losses were due to a similar cause, but chiefly among oxen that had been worked very hard in the cane-fields.

At Vega Baja bad water, together with very dry pasture, was the cause.

In Corozal many young animals died and many more were affected. On post-mortem examination the cause of the disease was easily detected. The large intestines were literally swarming with small worms, uncinaria radiata. This is practically the same worm that causes anemia in man, and is commonly called "hook worm." In fact, the symptoms were very similar to those presented by the human subject, general wasting, debility and diarrhœa. Although the great similarity of the uncinaria and the symptoms in man and in animals, yet it is thought that filaria of bovines will not produce the disease in man. I would not care to take chances on this point without proof to the contrary.

This is the only disease in cattle, other than those due to natural causes, that I have met during the past year.

At La Muda the trouble was entirely due to local infection of wounds caused, I have reason to believe, by the garrocha in the hands of the drivers; all the animals affected were oxen and bulls.

I believe that as a rule our native cattle are practically free from tuberculosis. There may be isolated cases, but I have not seen one during the time I have been in Porto Rico. I understand that a local veterinarian has met with two or three cases in cattle that had been imported from the United States. This is where our greatest danger lies, and it would be really too bad if, through any means, our already free from tuberculosis herds should become affected.

I think it is quite possible that many fowls, dogs and pigs may be infected with tuberculosis, as the disease is so common among the poor and who are so careless about expectorating. Those animals just mentioned are well-known scavengers, and as they almost invariably have their freedom, they must necessarily pick up sputum of tuberculous patients.

I have frequently submitted to the Director of the Laboratory quantities of blood taken from horses exhibiting symptoms of muermo for serum tests, drinking water to be examined and blood smears for microscopical examination. In each case I have received valuable and prompt assistance. In many of the cases from which blood was taken for serum tests I had also applied the mallein test; as a result, my confidence in, and appreciation of those diagnostic agents, have been greatly increased.

TENNESSEE.

By George R. White, M.D., D.V.S., Nashville.

Of sixteen eligible graduates in the State, thirteen are either members of the A. V. M. A. or have their applications for membership on file for this meeting. This leaves only three eligible non-members in Tennessee.

No effort was made during the past session of our General Assembly to secure further legislation. Our Practice act remains as originally passed two years ago. The State Board Veterinary Medical Examiners of Tennessee were appointed two years ago, and have to date issued certificates of permanent license to seventeen graduates and thirty-four non-graduates.

The colleges represented are as follows:

University of Pennsylvania	2
Columbian University	1
McGill University	1
Chicago Veterinary College	3
American Veterinary College	3
McKillip Veterinary College	2
Kansas City Veterinary College	2
Ontario Veterinary College	3

Since the last report several qualified men have located in the State; none have left so far as I have been able to determine.

Practice has been unusually good during the past year. Most all practitioners were kept busy throughout the year. Much more care and attention is given to live-stock and their diseases than formerly. The Tennessee State Fair of last year was a decided success, and appears to have stimulated live-stock interests to a marked degree.

Contagious and infectious diseases, viz.: Glanders, blackleg, rabies, hog cholera, Texas fever, &c., continue to cause heavy financial losses each year. We have had no anthrax for the past two years.

The United States Bureau of Animal Industry, through Dr. W. P. Ellenberger and his corps of assistants, have done and are now doing good and lasting work along the lines of Texas fever tick eradication. Much of this class of work yet remains to be done, but from present indications the whole of Tennessee will be above the National Quarantine line in the near future.

VIRGINIA.

By John Spencer, Blacksburg.

In the past year there has been more inquiry than formerly regarding applications for membership to the A. V. M. A., but unfortunately the numbers of eligibles are very few. There are, however, one or two in the State who are eligible and who will probably join the ranks before long. This indicates to the writer a healthy tone and points to the profession being in a prosperous condition in the State.

While the past season has been an usually good one for practice, it has been unusually free from infectious disease. Glanders was reported as existing in a R. R. camp in Southern Virginia last winter, and I was informed that all suspects were destroyed.

I regret very much my not being able to attend the meeting, but having just returned from my vacation in Canada I find new duties awaiting me which prohibit my further absence from the office. I trust you will have a good meeting and a profitable one and shall await patiently as possible for a copy of the proceedings.

WISCONSIN.

By W. H. Perrigo, Milwaukee.

It is a pleasure to announce that the veterinary profession of Wisconsin has enjoyed a most prosperous year, owing to the high price of all grades of horses, cattle, hogs, etc.

Active measures are being taken by the State Live Stock Sanitary Board to enforce the regulation requiring the inspection of all animals imported into the State for dairy or breeding purposes.

Tuberculosis, according to the report of the State Veterinarian, is on the decrease. The veterinary inspectors of the B. A. I., stationed at the several abattoirs of Milwaukee, say the percentage is about the same as in former years. There is the usual number of cases of glanders reported; also occasionally a case of rabies.

The graduated veterinarians of this State have been ably assisted by the society of veterinary graduates in securing new legislation regulating the practice of veterinary medicine. The new law is as follows:

No. 426 A.] [Published June 24, 1907.

CHAPTER 334, LAWS OF 1907.

AN ACT to repeal section 1492f, statutes of 1898, and to create sections 1492e—1 to 1492e—19, inclusive, statutes of 1898, relating to the state board of veterinarian examiners and to the practice of veterinary medicine and surgery.

The people of the State of Wisconsin, represented in Senate and Assembly, do enact as follows:

Section 1. Section 1492f, statutes of 1898, is repealed.

Section 2. There are added to the statutes of 1898, nineteen new sections to read: Section 1492e—1. A board of veterinary examiners, to consist of three persons, is hereby created to carry out the provisions of this act.

Section 1492e—2. Said board shall be appointed by the governor and shall consist of practicing veterinarians of the state, at least two of which shall be veterinary graduates.

Section 1492e—3. Each member of the board shall serve for a term of two years and until his successor is appointed and qualified, except in the case of the first board, whose members shall serve one, two and three years respectively and shall take the oath provided for public officers.

Section 1492e—4. Vacancies in such board shall be filled by the governor for the unexpired portion of the term.

Section 1492e—5. The officers of the board shall consist of a president and secretary who shall be chosen from the members thereof.

Section 1492e—6. One meeting of the board shall be held in the month of June each year at such a place as shall be fixed. Other meetings may be called by the board as they may determine. A majority of the members shall constitute a quorum. The secretary's record of the proceedings of the board shall be open for public inspection.

Section 1492e—7. Every person who was engaged in the practice of veterinary medicine and surgery in this state prior to the passage of this act may continue such practice without examination by furnishing proof of the fact that he was registered as a veterinary physician and surgeon in the county veterinary register and upon the payment of three dollars for his first license, and annually thereafter causing his name and residence to be registered by the board who shall keep a book for that purpose.

Section 1492e—8. A fee of one dollar annually shall be charged for such re-registration. All persons licensed by the board shall annually register in like manner. A certified list of all persons registered from each county shall be furnished the clerk thereof by the board and the names on such list shall be registered by said clerk in a book kept for that purpose.

Section 1492e—9. Each registration shall expire on the first April following its entry. Any person who has secured a license under this act, who may discontinue for a time, may appear before the board and be re-examined. A fee of five dollars shall be charged for such re-examination.

Section 1492e—10. Any person who may desire a license to practice veterinary medicine and surgery in this state may appear before the said board of veterinary examiners at any regular meeting and be examined in reference to his skill and knowledge in veterinary medicine and surgery.

Section 1492e—11. If such examination shall prove satisfactory to said board the board shall issue to such person a license to practice veterinary medicine and surgery in this state in accordance with the provisions of this act.

Section 1492e—12. All licenses shall be signed by the members of the board and attested by the president and secretary.

Section 1492e—13. Every license shall be prima facie evidence of the rights of the licensee to practice veterinary medicine and surgery in this state in accordance with the provisions of this chapter.

Section 1492e—14. Any person who shall practice veterinary medicine or surgery or any branch thereof in this state without being annually registered or without license herein provided shall be punished by a fine of not less than twenty dollars or more than one hundred dollars or less than thirty days or more than ninety days in the county jail, or both, for each and every offense. A violation of this act shall constitute a separate offense as to each patient treated.

Section 1492e—15. A person shall be deemed to be engaged in the practice of veterinary medicine and surgery who shall ask or receive directly or indirectly any pay or compensation for the treatment of any domestic animals, also menagerie animals, or any person who shall advertise or hold himself out to the public as a veterinary physician, surgeon or specialist, or who shall use the title of "doctor" or who shall append to his name the letters V.S., M.D., D.V.S., or M.D.V.

Section 492e—16. But nothing in this act contained shall be construed so as to prevent a bona fide student in regular attendance at any veterinary college in this state from practicing veterinary medicine and surgery under the direct supervision of one of his teachers in the regular infirmary of such college.

Section 1492e—17. Said board may charge each person applying for a license to practice veterinary medicine and surgery in this state who is not registered as a veterinarian prior to the passage of this act, whether such applicant passes such examination or not, a fee of five dollars, which in no case is returnable, and shall charge for each annual registration a fee of one dollar.

Section 1492e—18. From the funds so received all proper and reasonable expenses of the board and each of its members incurred in carrying out, maintaining and enforcing the provisions of this chapter may be paid. No part of such expenses shall be paid out of the state treasury. Any excess of receipts over disbursements shall be held by the board for future expenses of the board and its members. The secretary of the board shall have charge of the funds and shall be required to give bond in such terms as the board may see fit.

Section 1492e—19. This act shall not apply to persons engaged in the business of castrating domestic animals.

Approved June 21, 1907.

Papers and Discussions.

THE AGGLUTINATING AND PRECIPITATING POWER OF GLANDERED AND NON-GLANDERED BLOOD SERUM IN DIAGNOSIS.

By WALTER J. TAYLOR, D.V.M.,
Ithaca, N. Y.

After over two years' experience with the agglutination method in the diagnosis of glanders, I have been led to believe that it is one which in a comparatively short time will come to be recognized and to be fully relied upon. Last year in connection with Doctors V. A. Moore and Ward Giltner a paper was prepared setting forth the results obtained by other investigators and giving in detail the technique required in the application of the method. During the investigations which led up to the presentation of that paper, certain minor, yet important, points suggested themselves, but which for lack of time and material were necessarily left untouched. The purpose of this paper is to place before the profession the results of a year's further study concerning the agglutination test, the preparation and preservation of the test fluid; procuring and keeping the serum; the importance of macroscopic precipitations, and to present again the practical application of the method in the diagnosis of glanders.

During the past year I have made a special study of this method of diagnosis, paying particular attention to those factors which would tend to perfect its practical applicability. The following deductions concerning the constituents in making the test are drawn from this work:

CULTURE OF BACTERIUM MALLEI.

It has been clearly shown by previous investigators that all cultures of *Bacterium mallei* do not agglutinate satisfactorily. Schütz and Miessner have pointed out that a suitable culture when obtained is liable at unexpected intervals to lose its responsiveness to the agglutinins. They also recommended that the organism be passed through a guinea pig at least once in three weeks. This I have found unnecessary.

From a well-defined testicular abscess in a guinea pig which has been inoculated with the glanders organism, two or three pure cultures of *Bacterium mallei* are easily obtained. These cultures when kept at room temperature and unsealed are capable of living and retaining their agglutinating power at least two months. From these, sub-cultures may be made and the test fluid made therefrom. This may be repeated until the whole of the culture of the first generation is exhausted in the making of cultures of the second generation from which in turn a suitable stock culture of the third generation may be obtained. The accompanying diagram illustrates this method of preserving the cultures. It was found that cultures made in this manner do not begin to lose their agglutinating power until after the fourth generation is exhausted. Rarely, however, this happens after the third generation. It was also found that in this manner cultures which have reached only to the third or fourth generation may be used, the whole covering a period of from eight to ten months. Thus, I have found that after obtaining a suitable culture of *Bacterium mallei* it could be utilized in the manufacture of test fluid of good reacting capacity eight to ten months from the time the culture was secured.

THE BLOOD SERUM.

Procuring the Blood.—The procuring of the blood is a very simple task. By pressing firmly upon the jugular vein, at the angle formed by the mastoido-humeralis and the cervical panniculus muscles, that vessel is easily obstructed and is seen to fill rapidly until it stands out plainly. A large hypodermic needle, if inserted quickly and directed upward, will allow the blood to flow freely into a suitable container. A sterilized bottle holding about two ounces, having perfectly straight sides and possessing a wide mouth, is greatly to be preferred. It should be filled at least half full, closed immediately and properly labeled.

The blood clots very readily. As soon as the clot forms the serum will begin to collect. The separation of the serum from the clot is greatly aided by keeping the container as cool as

Table illustrating the manner of preserving cultures for the manufacture of test fluid.

ORIGINAL CULTURE.

Guinea Pig.—July 27, 1906.

Stock Culture.—July 27, 1906.

Test fluids.

Aug. 10	Aug. 28	Sept. 6	Sept. 20	Sept. 23	Oct. 5

Stock Culture II.—Sept. 23, 1906.

Test fluids.

Oct. 10	Oct. 27	Oct. 28	Nov. 5	Nov. 10	Nov. 28

Stock Culture III.—Nov. 23, 1906

Test fluids.

Dec. 2	Dec. 11	Dec. 16	Dec. 23	Dec. 29	Jan. 10, '07

Stock Culture IV.—Jan. 29, 1907.

Test fluids.

Jan. 13	Jan. 18	Jan. 28	Jan. 31	Feb. 6	Feb. 12

Guinea Pig.—Feb. 16, 1907.

Stock Culture, Feb. 25, 1907.

Test fluids.

Mar. 2	Mar. 15	Mar. 26	Apr. 3	Apr. 7	Apr. 15

possible. One c.c. of the serum is then added to 39 c.c. of a physiological salt solution which makes a dilution of 1–40. This diluted serum is then used in making the test.

Because of the simplicity of manipulation in procuring the blood, it is not to be understood that thorough aseptic precautions are unnecessary. Quite the reverse. Way has shown that thorough disinfection of both utensils and animal is greatly to be desired. He believes that in large stables where a certain number of glandered animals are known to exist, others may become infected by neglecting to disinfect the needle.

Keeping the Serum.—Ordinarily it is unnecessary that the blood serum be more than twenty-four to thirty hours old when tested. However, in case of inability to test caused by delay in transportation, lack of reacting test fluid on hand or other unavoidable delay, it may be necessary to keep the serum several days or more before testing. A number of experiments were made in order to determine to what age it is possible to keep the serum before testing and still secure accurate results.

As soon as the samples of blood were received, all were examined for the purpose of determining their degree of agglutinability. The serum was then treated in various ways for the experiment. Some samples were left in contact with the clot and two sera of equal reacting capacity were kept at different temperatures, viz., ice-box and room temperature. In others, the serum was drawn off and placed in two bottles. One bottle was placed in the ice-box and one left at room temperature. In still others, the serum was diluted as soon as received in a physiological salt solution in the proportion of 1–40. These were also divided into two portions and placed at room and ice-box temperatures respectively. The result of the experiment is seen in Table No. 1.

A glance at the following tables will show that serum kept in contact with the clot, pure or diluted, will retain its agglutinating power at least forty-eight hours. Those samples which were diluted 1–40 in a physiological salt solution and kept at the ordinary ice-box temperature were able to retain their agglutinating power for from three weeks to two months, while those which were kept in contact with the blood clot and those which were diluted at but room temperature, lose that power in from one to two weeks.

Sterility of the Serum.—From the fact that the agglutination method in the diagnosis of glanders involves bacteriological principals, the question of sterility of the serum has received some attention. The growing of the culture and the manufacture of the test fluid are to my mind the only points in which bacteriological technique becomes a factor. When the test fluid is made and is ready for use the organisms are dead. The remainder of the test, macroscopically at least, is a procedure involving chemical and physical phenomena only. When the test is utilized as a diagnostic agent and carried out with the live culture, micro-

TABLE No. I.

Reaction of serum left in contact with clot.

Samples left at room temperature			Samples left at ice box temperature		
Case No.	Reaction	Date tested	Case No.	Reaction	Date tested
15	1–1200	March 4, 1907	5	1–1000	March 4, 1907
15	1–1200	March 5, 1907	5	1–1000	March 5, 1907
15	1–1200	March 6, 1907	5	1–800	March 6, 1907
15	1–800	March 12, 1907	5	1–600	March 12, 1907
15	1–800	April 2, 1907	5	1–600	April 2, 1907
15	1–800	April 15, 1907	5	1–600	April 15, 1907
15	1–800	May 2, 1907	5	1–500	May 2, 1907
15	1–600	May 15, 1907	5	1–500	May 15, 1907
15	1–600	June 8, 1907	5	1–500	June 8, 1907
15	1–600	June 10, 1907	5	1–500	June 10, 1907

TABLE No. II.

Reaction of serum drawn off pure.

Samples left at room temperature			Samples left at ice box temperature				
Case No.	Reaction	Date tested	Case No.	Reaction	Case No.	Reaction	Date tested
26	1–1200	March 4, 1907	15	1–1200	10	1–200	March 4, 1907
26	1–1200	March 5, 1907	15	1–1200	10	1–200	March 5, 1907
26	1–1000	March 6, 1907	15	1–1000	10	1–200	March 6, 1907
26	1–1000	March 12, 1907	15	1–1000	10	1–200	March 12, 1907
26	1–800	April 2, 1907	15	1–1000	10	1–200	April 2, 1907
26	1–600	April 15, 1907	15	1–800	10	1–200	April 15, 1907
26	1–600	May 2, 1907	15	1–800	10	1–200	May 2, 1907
26	1–600	May 15, 1907	15	1–600	10	1–200	May 15, 1907
26	1–500	June 8, 1907	15	1–600	10	1–200	June 8, 1907
26	1–200	June 10, 1907	15	1–500	10	1–200	June 10, 1907

TABLE No. III.

Reaction of serum diluted 1-40.

Samples left at room temperature												Date tested
Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	
12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	March 4, 1907
12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	March 5, 1907
12	Negative	14	1-200	15	1-1200	23	1-800	25	1-600	26	1-1000	March 6, 1907
12	Negative	14	1-200	15	1-1000	23	1-600	25	1-600	26	1-1000	March 12, 1907
12	Negative	14	Negative	15	1-1000	23	1-600	25	1-500	26	1-1000	April 2, 1907
12	Negative	14	Negative	15	1-600	23	1-600	25	1-500	26	1-800	April 15, 1907
12	Negative	14	Negative	15	1-500	23	1-200	25	1-500	26	1-800	May 2, 1907
12	Negative	14	Negative	15	1-500	23	1-200	25	1-200	26	1-600	May 15, 1907
12	Negative	14	Negative	15	1-200	23	Negative	25	Negative	26	1-500	June 8, 1907
12	Negative	14	Negative	15	1-200	23	Negative	25	Negative	26	Negative	June 10, 1907

Samples left at ice box temperature																Date tested
Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	Case No.	Reaction	
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	Mar. 4, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	Mar. 5, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	Mar. 6, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	Mar. 12, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	Apr. 2, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	Apr. 15, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	May 2, 1907
6	1-1800	10	1-200	12	1-200	14	1-500	15	1-1200	23	1-800	25	1-800	26	1-1200	May 15, 1907
6	1-1600	10	1-200	12	1-200	14	1-200	15	1-1000	23	1-800	25	1-500	26	1-1000	June 8, 1907
6	1-1500	10	1-200	12	Negative	14	1-200	15	1-1000	23	1-500	25	1-500	26	1-1000	June 10, 1907

scopically as is ordinarily the Widal test, it becomes at once apparent that no foreign organisms should be introduced. On the other hand, when the "test fluid" used in the macroscopic reaction consists of killed glanders organisms held in suspension in a carbolized-salt solution, I am of the opinion that a slightly contaminated serum will give just as accurate results as one which is sterile.

The following will be of interest in this connection. A number of samples of blood were received to be tested:

Case No. 66 was found to contain a micrococcus, reaction 1–1800.
Case No. 69 was found to be sterile, reaction 1–1000.
Case No. 71 was found to be sterile, reaction 1–500.
Case No. 77 was found to contain a bacillus, reaction 1–500.
Case No. 78 was found to be sterile, reaction 1–1500.

The blood serum from case No. 69 was inoculated from case No. 77. Case No. 78 was inoculated from serum of case No. 66. These were all replaced in the ice-box and allowed to stand for forty-eight hours. In the meantime another series of samples were received from the same stable and cases Nos. 66 and 78 were found to be sterile in the second series.

These were all tested on the same day and an agar culture secured from each. The results were as follows:

Case No. 66 contaminated by micrococcus, reacted 1–1800.
Case No. 69 contaminated by bacillus, reacted 1–1000.
Case No. 71 contaminated by microccus, reacted 1–500.
Case No. 77 contaminated by bacillus, reacted 1–500.
Case No. 78 contaminated by micrococcus, reacted 1–1500.
Case No. 66 second series sterile, reacted 1–1800.
Case No. 78 second series sterile, reacted 1–1500.

This has been repeated from time to time and the results noted. In every case where sterile serum possessing either a high or low agglutinating power has been inoculated from a contaminated serum or from outside sources, such as dust from the floor, exposed to the air, etc., the maximum dilution at which agglutination has been observed macroscopically has remained unchanged. In quoting this experiment it is not my purpose to encourage carelessness in handling the blood, but to emphasize the point that, if a slight contamination takes place in collecting the blood, it does not vitiate the test. However, it is very desirable that every possible precaution should be taken to procure a sterile serum.

THE TEST FLUID.

The test fluid is prepared by washing the growth from the agar culture by the aid of a sterile wire loop into distilled water containing 0.85 per cent. sodium chloride and 0.5 per cent. carbolic acid crystals. This suspension is then placed in a thermostat at 60° C. for two hours, which kills the organisms. A temperature higher than 65° C. or lower than 60° C. should be avoided. After heating, the suspension is thoroughly triturated and filtered through sterile cotton. The filtrate thus prepared is diluted with the carbolized-salt solution until it is of a faintly cloudy appearance. The proper dilution of the filtrate can only be determined by experience. The test fluid gives the best results when made with freshly prepared carbolized-salt solution.

The results of previous investigators, as well as those obtained by us last year, indicated that the test fluid lost its responsiveness to the agglutinins in from one to two weeks. Further investigation along this line has proven that the results were due more especially to a deterioration of the blood serum than that of the test fluid. While carrying out our experiment last year, a sample of test fluid, made early in May, 1906, from a good reacting culture of the second generation, was placed in the icebox. Early in October, when work was resumed relative to the test, this fluid was subjected to the agglutinating power of a sample of known glandered blood and was found to react just as readily and at just as high dilutions as when first prepared five months previous. This immediately suggested a field for investigation concerning the keeping qualities of a good reacting test fluid. Accordingly a number of experiments were made on test fluid prepared at various times and kept under varying conditions, in order to determine to what age the test fluid could be kept and still retain its responsiveness to the agglutinins.

This work was carried on in conjunction with Mr. Way, who was making investigations with this method of diagnosing glanders. In all, thirty-two samples of test fluid were kept for subsequent testing. The reactions obtained by him, together with a series of tests on the same samples made three months later, is appended.

TABLE No. IV.

Table showing the reactions of test fluids of different ages with good reacting serum. (After Way).

No.	Date of preparation	Conditions of perservation	Reaction. Apr. 17, 1907. (Way)	Reaction. July 11, 1907. (Taylor)
1	May 2, 1906	Ice box	1–800	1–1200
2	October 5, 1906	Ice box	1–1200	1–1200
3	October 5, 1906	Room temp.	1–1200	1–1200
4	October 18, 1906	Room temp.	1–1200	1–1200
5	October 19, 1906	Room temp.	1–1200	1–1200
6	October 22, 1906	Room temp.	1–1200	1–1200
7	November 7, 1906	Room temp.	1–1200	1–1200
8	November 10, 1906	Room temp.	1–1200	1–1200
9	November 10, 1906	Room temp.	1–1200	1–1200
10	November 12, 1906	Room temp.	1–1200	1–1200
11	November 16, 1906	Room temp.	1–1200	1–1200
12	November 23, 1906	Room temp.	1–1200	1–1200
13	November 30, 1906	Room temp.	1–1200	1–1000
14	January 7, 1907	Room temp.	1–1200	1–1200
15	January 9, 1907	Room temp.	1–1200	1–1200
16	January 14, 1907	Room temp.	1–1200	1–1200
17	January 14, 1907	Room temp.	1–1200	1–1200
18	January 17, 1907	Room temp.	1–1200	1–1200
19	January 17, 1907	Room temp.	1–1200	1–1200
20	January 19, 1907	Room temp.	1–1200	1–1000
21	January 21, 1907	Room temp.	1–1200	1–1200
22	January 30, 1907	Room temp.	1–1200	1–1200
23	February 3, 1907	Room temp.	1–1200	1–1200
24	February 12, 1907	Room temp.	1–1200	1–1200
25	February 18, 1907	Room temp.	1–1200	1–1200
26	March 5, 1907	Room temp.	1–1200	1–1200
27	March 6, 1907	Room temp.	1–1200	1–1200
28	March 16, 1907	Room temp.	1–1200	1–1200
29	March 21, 1907	Room temp.	1–1200	1–1200
30	April 3, 1907	Room temp.	1–1200	1–1200
31	April 7, 1907	Room temp.	1–1200	1–1200
32	April 12, 1907	Room temp.	1–1200	1–1200

From the above table, it will be seen that, with two exceptions, each sample reacted at a dilution of 1–1200 in from three to fourteen months from the date of preparation. No. I gave a strong reaction after it had been prepared a year. Unfortunately, the limited amount preventing testing in higher dilutions or at the second series of tests.

Keeping the Test Fluid.—From the above list of experiments, it will be seen that the test fluid, when properly made and from a suitable generation of organism, can be kept until it is all used in the making of tests. However, it is not desirable to make up more than an amount sufficient to make from one hundred to one hundred and fifty tests, unless one is making a large number of tests each day. It has been found that test fluid should not be exposed to the action of too strong a light, if it is to be kept for any length of time. It should be kept in the dark and at a low temperature. During the summer months a refrigerator is the most desirable place of keeping it. In cooler weather, room temperature will suffice.

Checking the Test.—In order to avoid all possible error, each test should "checked." This is done by testing a sample of diluted serum of known reacting ability at the same dilutions as the one to be tested. A comparison of the results will reveal whether the unknown serum is glandered or not. In table No. III it will be seen that serum properly diluted and kept in the ice-box can be relied upon as a check for from three weeks to two months and occasionally longer.

MAKING THE TEST.

Three c.c. of the test fluid are placed in each of several small test tubes. With a small pipette, the diluted serum is added to the test fluid and thoroughly mixed. In making the different dilutions, the amount of diluted serum to be used is readily ascertained by the following table:

TABLE No. V.

Dilution of serum	Amount of diluted serum	Amount of test fluid	Dilution
1–40	1.2 c.c.	3 c.c.	1–100
1–40	0.6 c.c.	3 c.c.	1–200
1–40	0.405 c.c.	3 c.c.	1–300
1–40	0.3 c.c.	3 c.c.	1–400
1–40	0.24 c.c.	3 c.c.	1–500
1–40	0.195 c.c.	3 c.c.	1–600
1–40	0.15 c.c.	3 c.c.	1–800
1–40	0.12 c.c.	3 c.c.	1–1000
1–40	0.105 c.c.	3 c.c.	1–1200
1–40	0.09 c.c.	3 c.c.	1–1500
1–40	0.06 c.c.	3 c.c.	1–2000
1–40	0.03 c.c.	3 c.c.	1–4000
1–40	0.015 c.c.	3 c.c.	1–8000

Where dilutions higher than 1–1000 are made, a serum diluted 1–80 may be used to better advantage, unless the pipette employed is very finely graduated. In this case the amount of diluted serum for a certain dilution must be double that indicated in the table.

The mixture thus prepared is placed in an incubator at 37° C. for twenty-four to thirty-six hours. A temperature higher than 37° C. interferes with agglutination.

THE REACTION.

The reaction consists of a layer of the agglutinated bacteria, covering the entire convexity at the bottom of the tube. This film-like sediment may become so dense that it rolls in at the periphery. The supernatant fluid becomes clear in the lower dilutions, but in the higher ones the clarification may not be complete, showing that all the bacteria have not become agglutinated. This is further evidenced by the fact that the layer is less dense in the higher dilutions. The reaction may begin in six hours, but cannot be considered complete until twenty-four to thirty-six hours have elapsed. If no reaction appears in twenty-four hours it cannot be considered negative, as it may occur in from thirty to forty hours after setting. Often, however, a reaction appears in less than twenty-four hours.

After the agglutination is completed, further standing produces no visible change in the test fluid.

A negative result shows, in the course of twelve to twenty-four hours, a small, round, concentrated spot of sediment at the centre of the convexity at the bottom of the tube, the test fluid remaining apparently unchanged even after several weeks.

It was found, however, that occasionally when a test showed a negative result in from eighteen to twenty-four hours, ten to twelve hours further standing revealed a slight diffuse precipitation over the bottom of the tube which might be mistaken for a positive reaction. In other words, a test allowed to stand thirty to thirty-six hours showed both a negative and a very slight positive reaction. Upon examination of this precipitation, small clumps of the dead bacteria were found. In order to determine the cause of this, a number of samples of test fluid were incubated for variable lengths of time without the addition of any serum whatever, and examined at intervals under the microscope. Without giving in detail the results of these examinations, a summary of the findings is appended:

Of forty-three different samples of test fluid incubated without the addition of any serum, in

15 or 34.48 per cent., incubated 12 hours, no agglutination appeared.

18 or 41.86 per cent., incubated 24 hours, slight agglutination 2–3 in clump.

10 or 23.26 per cent., incubated 36 hours, still more agglutination 5–8 or 10 in a clump.

From the above it will be seen that with the appearance of the small round spot or " button " of sediment in the centre of the bottom of the tube in eighteen to twenty-four hours, the result may be interpreted as negative. Any precipitation on further standing is not to be considered.

Interpretation of Reactions Macroscopically and Microscopically.—Owing to the fact that certain workers with this method of diagnosing glanders were reporting reactions microscopically at very high dilutions, a number of examinations were made using the dead bacteria, in order to determine the dilution at which agglutination occurred microscopically. The microscopic examination revealed that while the microscopic reactions exceeded those obtained macroscopically, they were, on the whole, not as high as those reported by others. After the maximum dilution at which agglutination occurred microscopically, with killed cultures, had been determined, a series of tests were made in which the live organisms were used. These showed that the average agglutinating power of normal horse serum ranged at dilutions of from 1–4000 to 1–6000 while the blood serum from those animals which were affected with glanders agglutinated the organisms at dilutions of from 1–12000 to 1–25000 or 1–30000.

A careful study of this method of diagnosis macroscopically and microscopically, using both the dead and the live bacteria, has led to the belief that a precipitation of the agglutinated bacteria is essential before deciding whether a given serum is glandered or not. From one of the first communications of Ferdinand Widal bearing upon the subject of serum diagnosis and which was published in the *Lancet* for November 14, 1896, I quote the following: " Among the slow processes of diagnosis . . . one process consisted in adding to a tube of fresh bouillon a few drops of serum, then introducing into it a trace of a fresh culture of Eberth's bacillus, and placing the tube in an oven at a temperature of 37° C. and observing whether after fifteen or twenty-four hours a precipitate had formed at the bottom of the tube, showing under the microscope heaps of microbes, leaving the bouillon almost completely clear." Thus we see that Widal, to whom most credit is due for the introduction of serum diagnosis, recognized the importance of the precipitation of agglutinated bacteria in this method even when live organisms were used.

It is a well-known fact that agglutinins and precipitins are present to a certain extent in the blood of the normal horse.

Bonome has pointed out that during infection with glanders, both the agglutinin and the precipitin content of the blood is increased and that the former is increased to a greater extent than the latter. During the investigations just completed, I have been enabled to confirm this assertion of Bonome.

From previous investigations, I have found that the maximum dilution at which a precipitation of the agglutinated bacteria occurred, by the use of normal serum, ranged at dilutions of from 1–200 to 1–400, while the serum of glandered horses had the power of precipitating the agglutinated bacteria in dilutions of from 1–800 to 1–8000.

The following table, compiled from a study of this phase of the phenomenon and studied upon a herd of thirty-one horses, the greater number of which have been reactors to mallein, illustrates this point.

TABLE No. VI.

Macroscopic and microscopic agglutination of horses tested January 10, by the use of killed and living cultures.

Number	Macroscopic. Dead bacteria. 24 hours at 37°C.	Microscopic. Dead bacteria. 12 hours at 37°C.	Microscopic. Live bacteria. 12 hours at 37°C.
1	1–1000	1–1200	
2	1–8000	1–12000	1–30000
3	1–4000	1–6000	
4	1–2000	1–3500	
5	1–2000	1–3000	1–12000
6	1–1000	1–1500	
7	1–1000	1–1400	
8	1–800	1–1000	1–10000
9	1–1000	1–1300	
10	1–1000	1–1400	
11	1–1600	1–1800	1–6000
12	1–500	1–750	
13	1–500	1–600	1–5000
14	1–500	1–700	
15	1–1600	1–2000	
16	1–1000	1–1200	
17	1–1000	1–1250	1–25000
18	1–2200	1–2500	
19	1–800	1–1000	1–8000
20	1–1000	1–1300	
21	1–1000	1–1200	
22	1–1400	1–1800	
23	1–800	1–1200	1–12000
24	1–1000	1–1200	
25	1–1600	1–1800	
26	1–1600	1–1800	1–24000
27	1–1000	1–1000	
28	1–800	1–1000	
29	1–500	1–800	1–7500
30	1–1000	1–1200	
31	1–2000	1–2200	

In making the microscopic examinations using live organisms, only certain samples of serum were used. These samples were those which agglutinated the bacteria macroscopically at dilutions ranging from those obtained from the use of blood from the normal horse to those slightly affected, while even those which agglutinated the organisms at as high a dilution as 1–8000 macroscopically were tested. In this manner a fair average could be obtained without necessitating an examination of all the samples.

From the following table it will be seen that those samples of serum whose maximum agglutinating power had been determined macroscopically, showed only a slight increase in agglutinability when the dead organisms were used. On the other hand, when the live cultures were used, the agglutinating power microscopically was increased to such an extent that the test made in this manner bears no definite relation to that of the macroscopic method. It seems, therefore, that in order to obviate any possibility of the misinterpretation of results one method should be employed or else those reporting results should state which of the two methods was used in drawing conclusions.

Other investigators have reported results in which they were justified in concluding that the blood serum of a glandered horse shows a rise in *both* the agglutinin and precipitin content during malleination. This phase of the phenomenon has been tested by me in the following manner:

The day previous to malleination and upon which the initial temperature was secured, a sample of blood was drawn from each horse. The following day, while the temperature was elevated and a reaction was taking place, a second sample was secured from each animal. One week later, when the temperature had again reached the normal, a third sample was obtained. The blood was allowed to stand twenty-four hours in each case and the test was made as soon as the serum had collected. The results of these tests are appended in tabulated form (Table VIII). A record of temperature copied from the mallein chart accompanies this table.

A study of these tables will show that on the whole the precipitating power of the blood serum of glandered horses is not increased to an extent sufficient to attribute the rise to malleination, while on the other hand the agglutinating power microscopically is increased to such an extent that its significance cannot fail to be recognized. It will also be seen that in those cases where a slight increase in precipitation was apparent, during malleination, upon the return of the normal temperature, this power also returned to that of the blood before mallein was injected. Further, it is apparent that blood in which the agglutinating power has been raised by malleination, retains that power for a longer period of time than it does the rise in powers of precipitation.

While the agglutination method of diagnosing glanders is one which is as yet to be generally accepted and fully appreciated, it would seem from the foregoing experiments, that its diagnostic importance is such as not to be easily overlooked. As pointed out in previous investigations, it can be used in those cases which carry a high body temperature and which eliminate the practical application of mallein. The recent discoveries concerning the

TABLE No. VII.

Showing microscopic and macroscopic reactions before, during and after malleination, by the use of blood cultures.

Number	Day previous to malleination, Feb. 21		While temperature was up during reaction, Feb. 22		After normal temperature returned, March 2	
	Macroscopic	Microscopic	Macroscopic	Microscopic	Macroscopic	Microscopic
1	1–800	1–1000	1–800	1–1800	1–800	1–1000
4	1–800	1–1200	1–1000	1–2000	1–1000	1–1500
5	1–1500	1–1600	1–1500	1–2500	1–1000	1–1200
6	1–1200	1–1500	1–1200	1–2000	1–1800	1–1800
7	1–1000	1–1200	1–1000	1–1800	1–1000	1–1400
8	1–500	1–500	1–800	1–1600	1–500	1–600
9	1–800	1–1000	1–800	1–1400	1–500	1–800
10	1–500	1–600	1–500	1–1000	1–500	1–800
12	1–200	1–300	1–500	1–800	1–500	1–750
13	1–1000	1–1200	1–500	1–1000	1–800	1–1000
14	1–500	1–600	1–500	1–800	1–500	1–800
15	1–1200	1–1400	1–1200	1–2500	1–1200	1–1800
16	1–1000	1–1200	1–1000	1–2400	1–1000	1–2200
17	1–500	1–800	1–800	1–1500	1–800	1–1400
18	1–1000	1–1400	1–1000	1–1800	1–800	1–1500
19	1–1000	1–1000	1–800	1–1200	1–1000	1–1200
20	1–500	1–600	1–500	1–800	1–500	1–800
21	1–500	1–750	1–500	1–1000	1–800	1–1200
22	1–1000	1–1400	1–1000	1–2500	1–800	1–2200
23	1–200	1–200	1–200	1–1000	1–800	1–1000
24	1–1000	1–1200	1–1000	1–2200	1–1200	1–2000
25	1–800	1–800	1–500	1–1200	1–800	1–1000
26	1–1200	1–1500	1–1000	1–2200	1–1200	1–2000
27	1–500	1–1000	1–1000	1–1800	1–800	1–2000
28	1–500	1–600	1–500	1–1200	1–1000	1–1500
29	1–800	1–1000	1–500	1–1200	1–1200	1–2000
30	1–1000	1–1200	1–800	1–1800	1–800	1–1600*
31	1–500	1–600	1–800	1–1400	1–1000	1–1500

* Horses No. 2 and 3 had been slaughtered and horse No. 11 was out of stable when test was made.

TABLE No. VIII.

Mallein temperature chart of horses recorded in Table No. VII.

Sex	Temperature before Feb. 21, '07		Mallein injected Feb. 21, '07		Feb. 22, 1907. Temperature after injecting mallein							Extent of local swelling	Number
	3 P. M.	5 P. M.	5 P. M.	2½ cc.	4 A. M.	6 A. M.	8 A. M.	10 A. M.	12 M.	2 P. M.	4 P. M.		
M.	99	99	....	....	99.8	100	101	101.8	100.2	100.8	100	Small	1
M.	100	100.2	....	....	105.2	106	105	104.2	104	103.6	103.6	Large	4
M.	100	100.2	....	....	102.2	102.6	102.6	102.3	101.8	102	102	Large	5
M.	100.8	102	....	....	105	105	104.8	104	103	103.4	102.4	Large	6
F.	100	100.2	....	....	104	103.8	103.8	103.2	102.4	102.8	102.6	Small	7
M.	99	99	....	....	102.2	102	103.2	102.2	101.2	102	101.6	Small	8
M.	99	100	....	....	102.8	103.4	104	104.8	104.2	104.2	104	Large	9
M.	99	99	....	....	100	100	100.8	103	102	102	102.2	Small	10
F.	100	100.4	....	....	103.2	103	103	102	102	102.2	102	Small	12
M.	100	100	....	....	102	103.2	104	103.2	103	102.6	102.2	Small	13
M.	102.8	103.4	....	....	102.2	101.2	102	102	103	102.6	102.8	Small	14
F.	99.8	102.2	....	....	102	104.2	104	104	103	103.4	103	Small	15
M.	101.6	101.8	....	....	104	104.2	104	103.4	102.4	101.8	102.4	Small	16
M.	100	100	....	....	103	103	103	103	103.4	103.2	103.6	Small	17
M.	99.3	100.2	....	....	103	103	104	104.2	104	103.6	103	Large	18
F.	99.8	100	....	....	100.3	101.4	102.2	102	101.2	101	100.1	Small	19
M.	99.8	100.2	....	....	102	103	104.2	103.2	102.6	102.2	100.8	Large	20
M.	99.8	99.8	....	....	100.2	101	102.2	104	102.8	104	102.8	Small	21
M.	99.4	100	....	....	103.2	104.8	105	104	103	102.2	102	Large	22
M.	99	99	....	....	101.2	101.8	102	102.2	101.4	102	101.4	Large	23
M.	100	100	....	....	103	103	103.4	103	102	102.6	103.4	Large	24
M.	100	101	....	....	105.2	105.2	105	104	103	103	103	Small	25
F.	101	101.8	....	....	105	105	105	104.8	104.8	104.4	104	Small	26
F.	100.3	100	....	....	103.8	104.1	104.2	104	104	103.8	103.2	Medium	27
M.	100.3	100	....	....	103.2	102.3	102.3	102.2	101.8	101.2	100.6	Medium	28
F.	99.8	99	....	....	100	100.2	100.2	102.3	102	101.6	100.2	Small	29
M.	100	99.4	....	....	103.2	103.2	103	102	101.8	102.2	101.6	Medium	30
M.	100.2	99.4	....	....	103	103	103.8	103.2	102	102	101.4	Large	31

keeping of the test fluid and the perpetuation of a suitable culture have done much in establishing the practical applicability of the test.

CONCLUSIONS.

A careful review of the results obtained, as set forth in the preceding pages, seem to warrant the following conclusions:

1. The agglutination method for the diagnosis of glanders, while simple in its details, is one which requires care and precision in order to secure accurate results.
2. There appears to be no restrictions to its use in connection with mallein, as it has given satisfactory evidence of being an accurate check on malleination and can even be utilized in cases where the use of mallein is impossible.
3. A correct interpretation of the results lies not only in the agglutinability of a given serum but also in its power of precipitating the agglutinated bacteria.
4. The slight rise in the precipitating power of glandered blood during malleination is not sufficient to influence a correct interpretation of results when this is used in conjunction with mallein.

These experiments have been greatly facilitated by my being able to secure blood whenever necessary. This has been cheerfully furnished by Dr. W. H. Kelly, of Albany, to whom I wish to express my appreciation and thanks. My thanks are especially due to Dr. V. A. Moore through whose kind assistance and helpful suggestions this work has been made possible.

DISCUSSION.

Dr. Bell: Mr. President, although the author is not here, I happen to know that in this paper there are a number of very important points that you might regard as worthy to bring before the Association. I think many of the members will regard them as new and as very useful information. I think it would be to the benefit of the members if Dr. Moore would summarize these points that are regarded as new and important. If Dr. Moore will give a summary of the paper, I believe it will be very acceptable to the members.

Dr. V. A. Moore: Mr. President and Gentlemen: At the meeting of this society in New Haven I presented, in co-operation with Dr. Taylor and Dr. Giltner, the agglutination method for the diagnosis of glanders. We gave there the method in detail. On the continent of Europe, we had found that the method was accurate, so far as we were able then to determine, and that it was practicable as a test for glanders in making a diagnosis because of certain fundamental difficulties in the use of mallein; for example, when a horse is suffering from an elevation of temperature as the result of glanders, or other disease, mallein cannot be accurately used. There were, however, several technical points in this method which called for further study. The work has been continued, and these points in question have been further investigated during the year, and it is with the results of these investigations that this paper of Dr. Taylor's deals. The point of special and practical value in the paper, to which I would like to call attention, pertains to the preparation and preservation of the test fluid. You who were present at New Haven were shown the test. It was not believed then that the test fluid would keep for any length of time. That point is covered in the paper, and you will be able to get the detail in very much better form by reading the paper after it is published than from any attempt of mine to describe it.

DR. GILLILAND: I would like to ask Dr. Moore if in speaking of this microscopical test he means the drop test where they examine the drop under the microscope?

DR. MOORE: Yes, sir.

DR. GILLILAND: And in that drop test you get agglutination, but you lose precipitation: is that the idea?

DR. MOORE: That is the point; yes, sir.

DR. CONNAWAY: Mr. President, I just want to say, by way of report, that this test was applied in ten cases in Alabama, and so far it has worked uniformly and accurately. I should like to know what effect this has toward making an animal tolerant as is sometimes claimed. Does this agglutinating test have any power to confuse, or is it confusing under such circumstances?

DR. MOORE: The question, as I understand it, I cannot answer, because that particular point has not yet been tested. This, however, we have done. In the state of New York, the Commissioner of Agriculture, at my suggestion, is keeping under quarantine a number of horses that have reacted to mallein, and these horses are being tested from time to time with mallein along the line of Dr. Merillat's paper of yesterday before this body. When these horses have been tested with mallein we have applied this test, and at the same time, in many cases, we took the blood before the injection of mallein, and during the period of the reaction with mallein, and after the reaction had ceased. Now in those cases the agglutinating test and the mallein reaction have worked together perfectly; but I do not think that that answers the question. I think that the question Dr. Connaway wishes to raise is, when we take a horse with glanders and repeatedly inject mallein until he fails to react but is still in an active stage of glanders, whether under those conditions precipitancy would still take place? That has not been tried to my knowledge.

DR. CONNAWAY: It seemed to me that while mallein is really a great diagnostic agent that this might be used as a diagnostic means for determining some points where we have not used it before. If you get no agglutination precipitation it might be a sign of a cure.

DR. MOORE: There is a very vital point in connection with this which has not been worked out. I hope in the years to come we will find out some more of these things. One question is how long will the substances which produce the reaction remain in the serum. The statement has been made that the reaction disappears; that is, in the case of glanders, that there is a gradual disappearance of the quantity of the agglutination, so that the reaction in an old chronic case does not take place, but does in an acute case. That point we have not been able to acquire any data upon, but the question of the production of these bodies is indeed a very interesting one. The study is still going forward, and in time we will have more definite information to impart upon some of these very interesting points and questions which will occur to any thoughtful man.

DR. QUITMAN: I would like to ask Dr. Moore to what extent they have proven that no other disease germs will be precipitated under the same test? To what extent have you gone in those experiments?

DR. MOORE: I would say in that regard that we have not gone very far. We have made a number of tests upon horses suffering with other diseases, diseases like influenza, and thus far we have found the reaction to take place in no other disease. The reaction is supposed to be a specific one with the agglutination of this particular organism or by the action of this particular organism upon the cells of the body. So far as I know, and so far as our experience has gone, it does not take place with any other disease. Our examinations, however, have not been sufficient to enable me to make any conclusive statement upon this point.

DR. DUNPHY: I would like to state here that in our work at Parke, Davis' we have had occasion to test this matter out of horses having influenza, and we have found that we got no agglutination from this test. Probably we tried it on a dozen cases with negative results

DR. ACKERMAN: That is just the question. What are we going to do? A horse reacts to mallein, and fails to react to the precipitating test and vice versa. That is quite a common occurrence among horses in the city. I think we have it every little while. You perform your test and get your results. You talk with the owner, and you tell him now the mallein test is a little older test than the agglutination test and you explain them both to your client. You tell him mallein has been quite satisfactory, and perhaps we had better try that. This you carefully do, and get a number of reactions, but your horses do not show a physical sign, and in fact they look perfectly well. Then you tell your client before doing anything heroic, it would perhaps be wise to submit these reactors to the agglutination and percipitating test, and he agrees to this, then to your dismay, some of these reactors fail to show the blood test. Now what are we going to do with these cases, and what are we to tell the owners?

DR. MOORE: I have not had such an experience as that. So far as our experiments have gone in our laboratory what we have had has been blood from many cases that have not been tested so that we do not know what mallein would have done. We also had blood from a number of veterinarians in the state who have been very kind in assisting us to work out these cases, and we have never failed to get a reaction by the agglutinating test when the mallein test had been positive. Dr. Connaway and Dr. Berns, who have made a good many tests, may have had experiences of that kind. I do not know.

As to what should be done with these glandered horses, I think the whole matter should be referred for a report to the Committee on Diseases, because it is a very difficult question. It seems to me that the handling of glanders is one of the most trying, and one of the most perplexing questions that is before the profession to-day in regard to communicable diseases. We must know more about the pathology of the disease; the building up of the nodules, and the resistance of the tissues, all of these things ought to be more minutely investigated, and our knowledge along these lines increased to the greatest possible extent. There are a great many factors at work. We need the fullest possible information about these organisms, their effect locally and the development of nodules in the tissues. It is not until these organisms disseminate from these first foci that we get anything like a serious condition, unless first focus extends into a very large lesion. The length of time that the glanders organism will live in these nodules after they are apparently healed, of course, are questions which will not be answered until we have accumulated definite facts concerning a large number of cases. When we have enough of those, then we will be able to tell what shall be done with them. It seems to me that one of the most important things to be done in this connection is the accumulation of data along the line that Dr. Merillat suggested yesterday; the watching of animals that have reacted to either of these tests, the continued watching of them for a series of years, until we have accumulated data on hundreds and thousands of cases extending over a period of five to ten years, practically the lifetime of these animals, to determine what proportion of them develop the disease. We have plenty of evidence to-day that occasionally these animals that seem to be cured and stop reacting later develop the disease, and that the disease is disseminated from one stable to another, and from one farm to another by these occult cases. I think it is clearly a proposition that we do not know anything about until we shall have accumulated sufficient data on this subject. It seems to me that there should be a committee formed of men in practice, and who have had experience in testing, who could obtain proper facilities where they could quarantine these horses, or require the owners to keep them for a sufficient length of time so that this question could be settled. It is a perfectly easy one to solve, but from the very nature of the case it is going to extend over a considerable length of time, and require very careful observation in order to obtain accurate and reliable data from which just conclusions may be drawn.

Dr. Ackerman: Mr. President, I just want to go on record as saying that I am thoroughly convinced that mallein or the agglutination test is responsible for the spread of glanders in our cities more than anything else; and for this reason: in the anti-mallein days if a man had a case of glanders break out in his stable, the clinical cases were destroyed and the balance of the horses were looked over, and if nothing showed they were allowed to work and work together. To-day we go into a stable and we kill those that show clinical symptoms, test the others in the stable with mallein or test his blood and put them under observation. Now there may be, and there frequently are, from four to six or eight horses in such a stable that have reacted, and we will keep them by themselves under observation, and we will work them by themselves. The private practitioner, after giving such instructions to his client, goes away. He says, I will test them in about forty, fifty or sixty days. The owner says all right. In the meantime the owner begins to think it over, and he says, I do not want those horses around my stable. I will sell them while they look well and I can get a good price for them, rather than take the risk. He sells those horses, and those cases go out, to become centres of infection. In those four, six or eight horses we have got just so many new areas started from which the disease can be spread, while, if we kept them in one stable, they would either develop the disease there and be destroyed or die from other causes, with the infection limited to the one stable.

DR. KELLY: The state of New York has been conducting some experiments relative to what should be done with horses that have reacted to the mallein or agglutinating tests or both. In a number of studs within the past two years where several animals have been killed showing physical symptoms of glanders, the remaining exposed animals that did not show the disease upon a physical examination and only by the agglutinating or mallein tests, the state has deemed it advisable to permit the owners to use these horses under certain conditions, namely, that they must keep them apart from all other horses and each animal must have an individual harness, pail, curry comb and brushes. In every case these horses have been worked upon farms or in such manner that they could not come in contact with other horses and the mallein and agglutinating tests were made at intervals of four, six and eight weeks. Just prior to making the mallein test blood is taken from each animal for agglutinating. The horses are also treated with a tonic. In about 90 per cent. of this class of reactors they have apparently recovered for a period of two years.

These animals have been worked continually and from a physical examination have made a complete recovery, having ceased to react to the agglutinating and mallein tests, as well. These animals are kept under surveillance and in case they should be killed or die from any other disease a careful post-mortem has been and will be made. In one case where a contractor in the year 1905 lost twenty-five horses from glanders, in 1906 lost thirty-five, in 1907, so far, only one case has developed. I believe that an animal which only shows the disease by the mallein or agglutinating tests should not be killed, but should be worked by itself, given a tonic and be retested, as it is my opinion that a number of these animals will recover and make useful animals. I think this should be done in the state of New York especially, as we do not reimburse owners for horses killed by order of the Commissioner of Agriculture because they are suffering from glanders.

DR. QUITMAN: Mr. President, if I may be permitted another question relating more to the mallein test than to this test, I might say, in prefacing my remarks, that I have done some work with the agglutinating or precipitating test along with the mallein test. The great drawback to that test has been, at least supposedly, that it was usually an impossible test where the animal had an elevated temperature. In my experience, the mallein test can be carried along where there is a fever by making proper deductions for that elevated temperature. Now in the first place I believe that the instructions which are sent out along with every vial of mallein by the manufacturing houses are, to a very great extent, misleading, and I believe that it is applicable to this discussion to bring that point up here on this occasion. They tell you to first reduce the temperature by proper means, but they do not say, of course, what those proper means are, but leaving us to imply that we are to reduce the temperature by the administration of antipyretics. Therefore, the question immediately arises what antipyretics are we to use in such cases. Possibly some of the coal tar preparations as acetanilid, or possibly aconite. Usually, we find that it is a pretty difficult thing to reduce the temperature of a glandered horse. Now taking those cases that have been spoken of, and they have no clinical features sufficient to cause one to make a positive diagnosis. With a temperature under 103° or 102½°, under the influence of acetanilid, by giving it in fairly large doses you get it down to normal. Now then as you go along and inject your mallein you stop your antipyretic and in twenty-four hours from stopping the antipyretic your temperature jumps back again to where it was. Now then I think that that is a very dangerous and misleading feature. How is the experimentor to know whether that temperature is due to mallein reaction or simply to the temperature assuming its previous height? In my opinion, or at least according to the experiments I have carried along in our city,—and we have had considerable glanders, if you stop paying any attention to the temperature and take it along for several days before the mallein is injected so as to get an average it is a better course. I like to take it at least three times in twenty-four hours. I take it for several days and then inject. When there is an elevated temperature I do not expect to get the characteristic mallein reaction within the prescribed time. It often takes two or three days. It is delayed, and instead of setting in at the usual hours it does not start in till twenty-four hours, and then the temperature will rise above what it has been. Making the deductions along those lines, I think mallein often is a pretty good test even where there is an elevated temperature, but I do not believe that the presence of that elevated temperature is a signal that we should not try the mallein, and I think it is rather dangerous to reduce that temperature with antipyretics because it will tend to mislead the practitoner.

Now regarding the agglutinating test I would like to issue a word of warning to the profession at large. While it is a very good thing to experiment along that line, yet I think until the test has been more fully developed we had better go very cautiously before we decide to destroy a horse precipitating to the test alone, or not at least until we have established it by repeated experiments which will tend to establish or exclude all other sources of possible agglutination. It is a highly scientific test, and one that I believe is not a safe field test under ordinary conditions, or not at least until you have carried it along with mallein so that you can draw proper conclusions.

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JOHN SMITH AND HIS MISFORTUNES.

By A. LIAUTARD, M.D., V.M.,
Paris, France.

The story of a recent graduate who might possibly be one of your family, as a son, a nephew, or an intimate friend.

If you will allow the supposition and entertain it, I feel quite sure that I will secure your earnest attention and no doubt your sympathy and powerful influence.

This young graduate, whoever he is, whom I will call JOHN SMITH, has gone to a veterinary college. He has worked hard and knows the sacrifices that his parents have made for him. He appreciates his obligations and is proud and full of the great joy that his successes give him. He is also happy that he can come back to you with his diploma. The ambition of his several years of serious work at college is realized and he is happy in the pride that he will read in your eyes when he shows you the hard-earned parchment.

He is entitled to a little rest. He has studied hard, and passed many half nights bent over his books reading and reading again. His dreams have been full of medical subjects, his poor brain is all shaken, his nerves are overstretched, his resisting power is overtaxed, he must have a rest! But after laying aside for a while books and notes, soon the question comes to him, "NOW WHAT SHALL I DO?"

Three roads are open to him—that of general practice, special sanitation or army veterinarian. He is a regular member of the profession, and can have access to all.

He will enter the first.

Perhaps his father or some other relative is already in practice. He has met with success and is getting old. He may succeed and do as well. It is a good opportunity. There is but a little formality to comply with to obtain a license.

That formality is of no account, if there is no law protecting the profession and the practice of veterinary medicine in the State where he intends to begin and take his chances.

But if there is a law, he must comply with it. He is referred first to the Board of Veterinary Examiners.

What? A Board of Examiners!

But he has just been before one board; and one that meant business. They were specialists on the various branches of veterinary medicine, as anatomy, physiology, theory and practice, surgery, obstetrics, etc. Now he must go before three, four or five men, who constitute by law the Board of Veterinary Examiners and submit to another examination, which will have the pretension of being similar to the one he has just passed, and they claim the right to say whether he is or is not allowed to register and practice.

"But I have my diploma!" he exclaims. "It is signed by all my teachers." It is perhaps signed by the chancellor of a university. It matters not. The Board of Examiners does not care for his diploma, and does not even look at it. The law does not require it.

Well, the law is the law. He has to submit to it, as all good citizens do, and behold, at that examination by the Board of Examiners, which is probably not even equal to a college quiz, he fails in passing it satisfactorily. Has the examination been too hard? The questions too difficult? Has there been any other reason? No matter, he is plucked, that is all he knows, and he cannot complain, as the board allows him, with a kind of sarcastic generosity, six months to prepare himself for another trial.

There is also the case when he is successful and when the board grants the authorization to register and obtain a license.

Still, what has his diploma been good for?

However, he starts practice, either with some practitioner already registered or by himself. But beginnings are hard. He is a new man, who has to fight against an old established confrere. His chances are not what he thought they were, and finally he decides to give up the place and try somewhere else. He packs up his goods and starts for another State.

Here again the same condition faces him.

Some time has elapsed since he received his degree and yet it is either settling in a State where there is no law or in one where there is a Board of Examiners, and here again it is another examination.

The license that he has fought for is useless; the board does not recognize it. And it is for the poor graduate another quiz. Yes, providing he is not stopped before starting. By what?

By the fact that the requirements of the school from which he has graduated do not comply with those demanded from veterinary students in that State.

To resume the position of JOHN SMITH. His diploma is of no use to him, as with it he can only settle in a State where there is no law to protect him, or if he wishes to go into a State where there is one, he has to run the chance of passing, that of being rejected and sent back for six months or to be refused examination altogether. Fortunately, this last occurred in only one State in the Union. That is even too much.

Of his diploma not a word has been said! It is a useless evidence of his capacity. He cannot benefit by the advantages which it is claimed to grant him, although given by a school in good standing, after years of attendance as required by law, and after an examination on all the branches of veterinary medicine. Notwithstanding all those, there is but one door open to him, the one which will send him to a State where his profession is not protected.

Can you be surprised if then he gives up the idea of following the road of his first desire, where he might have done such an amount of good, and to hear him say: " I will try the road of the sanitarian. Perhaps I will succeed better!"

The road of the sanitarian is for holders of government positions, such as those of the staff of the Bureau of Animal Industry, and therefore is accessible only under some special conditions, namely, an examination before the United States Civil Service Commission.

Our friend, John Smith, wrote to the proper authorities asking for information as to the requirements and conditions of this examination, as long as he was not yet through with being examined.

He soon received a lot of papers with some special instructions, which were to be filled out and a special one informing him that an examination was to be held on a given date and place. A Manual of Examinations had also been sent and the requirements of the examination were found on Section 213 of the same.

Strange to remark, nothing was said of the diploma that the candidate might have, except that the applicant must be a graduate of a veterinary college.

The official requirements are known to all of us, and John Smith knew them also.

Spelling, arithmetic, letter writing, penmanship, copying from plain copy!! That is nothing. John Smith is a bachelor of sciences; he has a certificate of high studies or perhaps only a common school education which permitted him to matriculate in a veterinary school; therefore, he could take that test without trouble. It is true there were also questions on veterinary anatomy and physiology, on veterinary pathology and meat inspection, on theory and practice of veterinary medicine, but his diploma would certainly vouch for him then or perhaps his license, for which he has passed an examination. Error: these were of no use to him. Examination before the Board of the Civil Service Commission had to be passed not only on these indicated subjects, but on others, as he has heard, although not officially, that special sets of questions were asked relating to sanitary science and sanitary police, sanitary pathology and medicine, meat inspection, microscopy and microbiology, on meat inspection laws and regulations, etc., etc.

Of course then his diploma is of no use to him, and whether he has been to a government school or to a private college, his chances of successfully passing were very slim, and that explains well the notice, which in the Manual reads: The supply of eligibles for the position has not been equal to the demand.

Yet, John Smith has the good luck to be admitted. But we may ask: How? If we take into consideration the fact that the branches pertaining to the special questions and which are not mentioned in the Manual at Section 213, are taught out of twenty schools in the country in the following deficient manner: Bacteriology in 15 schools, histology in 13, meat inspection in 12, sanitary medicine laws and regulations in 8, dairy inspection in 2, and biology in 1. These figures are gathered from Professor Williams' article on "Veterinary Education in America."

John Smith is Veterinary Inspector of the Bureau of Animal Industry, but he cannot be a permanent appointee until he has been probated for six months. It is the law. It is the rule. Never mind, after that time he will have a position for life. And until he is a permanently appointed man the wheel of fortune will keep on rolling. He, however, renounces this good opportunity and will try the third and last road—the Army.

Before starting to obtain information as to what he must do to get a situation, he thought of writing to a friend, a schoolmate, who had attempted to enter the Army. The answer he received was far from being encouraging. Yet he thought he would try and apply.

The requirements necessary for entrance into the Veterinary Service of the Army are laid down in the paper that Dr. C. H. Jewell, Veterinarian to the 13th Cavalry, read at the meeting in New Haven last year. They are as follows:

"The applicant shall pass a physical examination and come up to the standard required of a recruit. He shall be a graduate of a recognized veterinary college having a three-year course, with at least a six months' session each year. He must furnish evidence of a good moral character and aptitude for the service, the latter to be judged by the board of officers appointed to examine him and he is obliged to pass above sixty-five per cent. in each of the following subjects: English, including reading, spelling and grammar, American history, geography and arithmetic. This makes up the basic examination. The professional examination consists of the following: Anatomy, physiology, materia medica, practice of medicine, sanitary medicine, surgery, meat inspection, pathology, feeding and watering, bitting and saddling, horse-shoeing, conformation and soundness. This examination covers a period of eight days and is most thorough in its nature."

Taking into consideration the very little prospects that the position of Army Veterinarian offers after all, and with everlasting threats of examinations and examinations again, John Smith thinks it is too much, and gives up the idea.

Three different openings for which several years of hard study had been spent in preparation, for which a diploma has been won after severe struggles, and when a knock is made at the door of each of these openings, with our diploma in hand, it is ignored, and the door remains almost closed. It has been useless.

We thought it the highest proof we could get of our thorough knowledge of every branch of the profession of our choice, accepting that we might be deficient in some specialities and willing to prepare ourselves for them. But no, our diploma is worthless or the examinations that are asked of us, regular graduates of a school in good standing, are improper, vexatious, and uncalled-for. Who knows, if some one might not suggest that the unsuccessful result announced may not have been the conclusion of personal feelings more than ignorance on our part!

To resume, what does John Smith complain of and what does he ask?

That his diploma should not be a dead letter and should be accepted by the various boards, before which he has been obliged to present himself, as an evidence of his professional qualifications.

He asks that the Board of Veterinary Examiners, who alone can give him the authorization of registering and getting a license, accept his diploma and not oblige him to submit to an examination, which in its results can be but a comedy or an insult to the professional respectability of the signers of the diploma, of the teachers that have put their names to it!

He asks that the same should be for his admission for veterinary inspectorship in the Bureau of Animal Industry and also in the Army, excepting of course the obligations of a special examination on some special subjects which relate to these special positions, examinations to which the candidate must prepare himself in or out of the veterinary colleges, in a special course of instruction in these branches.

He asks that his knowledge in anatomy, physiology, theory and practice, surgery, obstetrics, therapeutics, etc., etc., all the branches constituting a veterinary curriculum be recognized by the exhibition of his diploma and that examinations on those subjects be eradicated from the program of the various boards, where they are at present demanded, namely, Veterinary Boards of Examiners, Board for Veterinary Inspectorship of the Bureau of Animal Industry, Board for Admission in the Army!

Will the American Veterinary Medical Association stand by John Smith? Will she protect him as well as all future generations of veterinarians that may come after him?

Gentlemen, do we ask impossibilities?

We think not. The fault of our failures and the cause for our complaint is not with the boards that, at first, I am sure you think I am attacking. I do not.

These boards are in their proper place. Their work is good. Their demands even are just. If they did not exist, they ought to be created. And if in every one, we read a request of an examination of the various departments and sub-departments of veterinary medicine, it is not possible for them to do otherwise. It is not because they wish to ignore our diplomas. It is not because they desire to insult the men who, so many of them, work so generously for the profession without remuneration. What is wrong is the organization of the schools, the admission, the attendance, the division of the curriculum, the length of studies, and the requirements for graduation, etc.

Are we to be surprised to hear Dr. Jewell say in answer to Prof. Harger: "I would say that there are many veterinary colleges whose graduates are not competent to take the examination. There is a class of men who come from the better colleges, who seem to be deficient in their English education or who have never prepared themselves sufficiently in it."

And are we to wonder that at the examination for sanitary inspector, the candidate has to pass on spelling, arithmetic, letter-writing, penmanship, etc., etc., when we read the requirements of admission for matriculation in the various announcements of the veterinary colleges of North America or in the articles that appear in our periodicals on the subject. Have a high standard of matriculation similar to that asked in some of our colleges and there will be no more reason for Dr. Jewell's remarks nor for the requirements of the Civil Service Commission.

And if the State Boards of Examiners have also demanded the examination, it is, I believe, to a certain extent, to comply with the law, but principally because they were unable to distinguish between diplomas, between the one to accept and the one to refuse or ignore. They then ignore all. I think, however, that now this question is somewhat settled by the second recommendation of the Committee on Intelligence and Education made at New Haven, which says: "That graduates of the following schools shall be considered eligible to membership in the A. V. M. A., New York State Veterinary College, University of Pennsylvania (Veterinary Department), New York American Veterinary College, Laval University (Veterinary Department), Chicago Veterinary College, McKillip Veterinary College, San Francisco Veterinary College, Kansas City Veterinary College, Ohio State University (Veterinary Department), Washington State College (Veterinary Department), Iowa State College (Veterinary Department), Cincinnati Veterinary College." If the A. V. M. A. recognizes the graduates of those institutions as eligible, why should not their diplomas be accepted by the various boards of examiners we have been speaking of?

I am sure that for you, with a diploma from either of these schools, our friend John Smith would not have had need to pass any more examinations.

But truly, can we wonder that our diplomas do not command the respect they should and do not carry the weight they ought when we read the arrangement of the curricula of the numerous schools, and when we see the varieties that they present. Subjects that are taught here, poorly there, and not at all in others.

Is it not but to be expected for the officers of the Bureau of Animal Industry to say: The supply of eligibles for the position has not been equal to the demand, when we find that the essential branches pertaining to veterinary sanitary science are taught so imperfectly in seven schools and ignored in thirteen out of twenty!

Having endeavored to point out the lack of respectability granted to our diplomas; having also pointed out to you that which can be considered as the cause, viz.: the peculiar conditions of the schools, I may, in closing, refer you in a few words to some of the summaries of the reports of the Committee on Intelligence and Education. In 1905 Dr. C. J. Marshall, Chairman, said: " The officials or representatives of the various veterinary institutions propose as a solution of the education problem: Section 4—Uniform entrance requirements." To which, as I said before, you will add, no doubt, must be those of high school education as already existing in several schools. Section 5—A uniform curriculum—which you can appreciate, will permit you to obtain from Board of Regents of University to alter the requirements that they exact in some States at present. Section 6—Uniform graduation requirements. Section 7—Uniform degree. In 1906, Dr. Marshall, again Chairman of the Committee on Intelligence and Education, again recommends: Section 8—that the Association encourage uniform entrance requirements, uniform curriculum, uniform examinations, uniform graduation and uniform degree.

It is two years since these recommendations were presented to your Association. The Association of Veterinary Faculties and Examining Boards has been organized; it has had time to prepare a plan, by which something better than to leave them on paper, could be made and render these recommendations active.

No doubt it will do justice to its duties.

Of course, it will be difficult. There will be, as there has been before, some one to object with Federal or State consideration, who will say that the examinations are regulated by Regents of universities, as for instance, in the State of New York; and that to these regulations you have to submit. I know all that!

But remember your power, members of the A. V. M. A.!

If all the schools of America have adopted a uniform length in the course of studies, because you demanded it, why should you have less power in obliging them in adopting your reforms on educational regulations, which will allow graduates of our schools to hold and be proud of a degree respected and recognized equally by all, and certified by an American veterinary diploma, and which would raise the profession in the estimation of the public at large, as well as in that of the various institutions where veterinary services may be called for and also among the other nations of the world.

DISCUSSION.

Dr. Fish: Mr. President, it seems to me that the only remedy for the evils that Dr. Liautard points out is uniformity, as stated at the conclusion of his paper: but uniformity is under the present conditions in this country an ideal condition, and one that we cannot attain to very soon. The condition, however, is not at all hopeless. A great many of these things now exist in some of the continental countries, but it is easier to bring about such a condition of affairs where there is a central government which is interested in veterinary education. In this country where we have practically a government for every state in the union it may not be so easy to get them to take uniform action, although we hope it may be possible sometime to get the central government interested. While it may be possible to get the government at Washington interested to the same extent as in some of the countries of Europe it seems to me it will be sometime yet before we can hope to do so. The American Veterinary Medical Association, can exert a great deal of influence in the matter, and it does now, perhaps, exert an indirect influence toward that end. It cannot compel the various schools to have uniform requirements, uniform curricula and uniform examinations, but it can influence them to some extent by refusing membership to those who do not come up to the standard that we set.

Another possible remedy, it seems to me, might be applied, which would result in a substantial improvement of the situation, and that is co-operation of the schools. They can make an agreement among themselves, if not among all at the beginning, then amongst those who are in sympathy with the movement. They can co-operate to the extent of declaring that certain requirements must be exacted, for instance, that they must arrange their curricula in a similiar and uniform manner. I hope, although this matter does seem somewhat ideal, and although it seems a long way in the future that we may attain to it sometime. I think there are some signs now of a gradual working in that direction.

Dr. Noack: Mr. President, I think the comments in Dr. Liautard's paper on our American conditions to-day are not in all respects justified. He looks at things from the European standpoint, and not from the standpoint he ought to consider events in America. If conditions in this continent were like those in Europe, he might be right, but where Dr. Liautard himself has lived here in the United States, I think he ought to know that the colleges in their demands for education are not up to the standard of Europe and differ widely from each other in this direction, and, therefore, our boards in the different states are perfectly justified in demanding another examination because every state has to protect its own institutions. If one state demands higher preliminary education, that state certainly has a right to demand the very same preliminary and professional education from any man coming from a college located in another state so as to protect the required standard of education. Certainly, I am willing to admit if the standards were all alike, then it would be injurious to demand another examination of this man, but as long as the conditions in the United States in the veterinary colleges differ so widely, then for just so long, we shall have to keep up the examinations. I think the time is not very far off when we will come to the European standard, and have the same conditions as in Europe, uniformity of preliminary education, uniformity of examinations at the colleges, and I expect then Dr. Liautard's demands will be satisfied. I think very probably in the next twenty-five years, we will get there. If Dr. Liautard would compare the American condition as he ought to with the condition existing in Europe, different nations, for instance, if he would take France, and Germany and compare them with each other, he would see that the condition existing between these two nations is exactly the same as it is among our schools in different states. A Frenchman cannot go into Germany and practice. He has to pass the examinations which are required there, the preliminary examinations, as well as the examinations for practice of veterinary medicine. Although a man who has passed the examination in France, according to the French regulations will have very little trouble to gain the permission to practice in Germany, because the demands in examinations are very much alike, that is, the education demanded in France is found by a practitioner who goes to Germany to be very much the same as a French college. Furthermore, in France the professional examination is not recognized if there is a vacant chair in any college, and a man wants to become a teacher in the college, he has to pass another examination to show that he is up to the standard. At least, Dr. Liautard should remember that France and the other European countries have a good start on America in veterinary science. America is young, but it has progressed very rapidly, and I think will progress yet more rapidly in the next twenty or twenty-five years. I hope in twenty-five years, we will be able to compete with any of the European standards in veterinary colleges, and have the same education in all the states of this great Republic.

Dr. Hoskins: Mr. Chairman and Gentlemen: I think perhaps the absence of our old friend Liautard from this country for a number of years has caused him to be not wholly in touch with what we are aiming to do through these state boards. Whenever you attempt to pass state laws or establish a state standard, you must do that with the idea of guaranteeing to the people of that state certain qualifications that the men must possess who are going to pose before the public as men skilled in the science of medicine. These state examining boards have been forced upon the profession in the various states because of the wide variation between the curricula of the various schools. In other words, they have had standards that varied so widely that it has not been possible for the people of a state to be able to judge of a man who entered upon the practice of veterinary medicine except as it was done by some examination to show to what extent a candidate came up to a fixed and definite standard prescribed by the state. In most of the state laws they have stipulated the subjects upon which these men must qualify, and by an examination it becomes very easy to know whether a man is qualified and worthy to receive a license by virtue of his school training, or whether he has been made worthy of a license by virtue of long years of experience and practice. Now it is extremely gratifying to know that after two years of work by the Association of Faculties that we have arrived at a minimum proposition for each school to live up to. That proposition is fixed in fifteen different points which will be submitted to the incoming officers of the organization, and every school in this country and in Canada will be expected to live up to that minimum standard of requirements. It is not all that we would like to have, but it does fix a certain standard from which we can measure whether veterinary education is progressing in a satisfactory way or retrograding, furthermore, this Association should recognize those schools, and give its active support according to how well they live up to those requirements of education and training of their students. There is one point about our situation with which I am not well satisfied; and that is, we are attempting to maintain the standard of veterinary education in our private schools and colleges, based wholly upon the income from student's fees. Veterinary education to a much greater extent than any other branch of medicine, or any of the arts and sciences, can better be given in schools which receive state aid. This support and assistance is given for the reason that veterinary education touches directly the interests of a very large number of our people, in fact, in some way, touching the interest of almost every man, woman and child in the United States. Hence, I say that we must look forward to federal and state support for our schools, and not be so dependent, as we have been in the past upon the private institutions and colleges for the dissemination of veterinary learning.

Dr. Melvin: Inasmuch as the examination required by the Civil Service Commission for entrance into the Bureau of Animal Industry has been touched upon, I think it would be only right to explain to the Association that there is no discrimination whatever against the veterinarian. Practically the same general style of elementary examination is required for entrance into all the different branches of the civil service. No matter what college a person may be from, if he wishes to enter into the service of the Government—into the Marine Hospital service, or the Agricultural Department, or other branches of the service—he will be required to pass this elementary examination. It is no discrimination whatever against the profession that this examination is required of veterinarians; and I think that it is eminently fair and proper that it should be required, for the purpose of determining the proficiency of an individual in the principles of English, arithmetic, and similar branches. The examinations show plainly that it is necessary.

Not only that, but in the technical examination itself, the six months' probation that has been spoken of I think is a very necessary provision. While a man may pass an excellent examination in all branches, he may be found unsuited to the work for which he is wanted. This six months' period gives the bureau an opportunity to test an individual by personal experience, and enables it to find out whether he is suited to the work or not. A man may have some disqualification that thoroughly unfits him for this work. His habits may be such that it is not desirable to retain him in the service. From that point of view I would look upon this six months' probation as simply an extended examination of the individual before he receives a permanent appointment; and from my experience with the bureau I think that it is a very desirable feature.

Dr. D. Arthur Hughes: Mr. President and Gentlemen: The first gentleman who spoke this morning drew attention to certain contradictions in Dr. Liautard's paper. I want, just for a moment, to draw attention to another contradiction. His plea is uniformity, and for the necessity of the acceptance, in all branches of government work and state work, of the diploma of the schools. The writer seeks to convey the idea that that is all that should be necessary, provided the diploma is properly granted. Now in an article which Dr. Liautard wrote, and I think published in the August number of the *American Veterinary Review*, the first or editorial part of the *Review*, he tries to explain to the army veterinarian the difference between the methods whereby the French army veterinarians are trained and those by which the American army veterinarians are obtained. He shows distinctly, if my memory serves correctly, that in France, which has national schools, and which prepares its veterinarians for all branches of the service, private and public, at those veterinary schools, as I understand it, a man who is graduated from one of those national schools, if he wants to enter the army service, must in addition to having passed through that regular course of national matriculation and a national curriculum in one of the national schools, and taken his diploma, must nevertheless go to the national army school and there, at Saumur, go through with a special training and special examination, after which he will be admitted in the regular way to pass from the rank of first lieutenant all the way up to the rank of colonel. Your attention was drawn by the first gentleman to other contradictions in Dr. Liautard's paper, and I just wish to bring this fact out in addition to what was said by Dr. Noack.

TUMORS.

By A. T. KINSLEY, M. Sc., D.V.S.,

Pathologist, Kansas City Veterinary College, Kansas City, Mo.

In selecting a subject upon which to present a paper to this Association the writer thought it might be of some value to call attention to that group of pathological conditions suggested by the term "Tumor." It is apparent that little interest is taken in this theme by some veterinarians, but, it is nevertheless of practical importance. The progressive and successful veterinarian engaged in any phase of the profession realizes the importance of a knowledge of tumors and a careful observer frequently encounters them. The frequency of tumors in animals treated in Berlin, Dresden, and Munich veterinary colleges for an average period of seven years is as follows:

Of 86,613	diseased horses,	1,113	suffered from tumors, or	1.3 per cent.
Of 85,537	diseased dogs,	4,020	suffered from tumors, or	4.7 per cent.
Of 4,972	diseased cattle,	102	suffered from tumors, or	2 per cent.

The term "tumor" was formerly used to indicate any swelling in the animal tissues. They, more than any other pathological entity, have been studied and investigated by scientists, and yet little is known of their pathology. With the present limited knowledge it is impossible to clearly differentiate them by definition from some other pathologic conditions. They have been defined as new growths of tissue developing independently in any tissue of the animal body and are atypical in structure and function. A more concise idea can be formulated by thinking of them as parasites, that is, they are new growths of tissue that develop in or upon the animal body at the expense of the animal. They are subject to the same pathologic conditions that the normal tissues are, as degeneration, necrosis, etc.

Structure.—Tumors are composed of cells and usually an intercellular substance. The cells may be similar to normal embryonic cells or adult cells. The embryonic tumor cells differ from normal embryonic cells in that the former has no tendency to become matured and the latter has. Cut XI shows a section of a sarcoma composed of embryonic cells that are similar to embryonic connective-tissue cells. Papillomata are composed of cells that are very similar, if not identical to adult epithelial cells, and are supported by an adult connective-tissue framework (Cut XXXI). The intercellular substance of tumors is as variable as the intercellular substance of normal tissues. Tumors having a mesodermal origin usually have an intercellular substance closely resembling that of normal connective tissue and hence may be fibrous, cartilaginous, osseous, etc. Tumors of an ectodermal or an entodermal origin may appropriate the preëxisting tissue framework for their stroma. Some tumors, like some normal tissues, are practically devoid of intercellular substance. Again in some tumors the blood-vessels are the only intercellular substance. The intercellular substance or stroma is an integral part of a tumor anatomically and its function corresponds to the function of intercellular substance of normal tissue. The cells and intercellular substance of tumors may be so arranged that the resulting structure approximates that of normal tissue (histoid tumors) but is never identical to a normal tissue. The different parts of a tumor may be assembled so that the resulting organization appears as an atypical gland or organ (organoid tumor), or tumors may be composed of structures derived from all three germ layers grouped indiscriminately but having some resemblance to an embryo (teratoid tumors).

Tumors are usually nourished, like normal tissue, by blood and lymph. Blood and lymph vessels may be structurally the same as normal vessels, or they may be composed entirely of tumor cells. The vessels have their origin from preëxisting vessels in the tissue from which the tumors are developed. They may be telangiectatic, cavernous, or plexiform, and their course is usually along the tumor stroma. Blood and lymph may also permeate the tumor through intercellular spaces, frequently resulting in hemorrhage or lymphorrhage. Some tumors have no blood or lymph supply, their nourishment probably being derived from consumption of normal tissue.

Nerve cells and axones have been demonstrated in some tumors. They are, in some cases at least, a result of peripheral extension and development of the tumor tissue around normal nerve tissue, thus entangling it in the tumor. It is an open question whether nerve tissue exists in tumors except in those derived from normal nerve tissue or those in which normal nerve tissue is entangled.

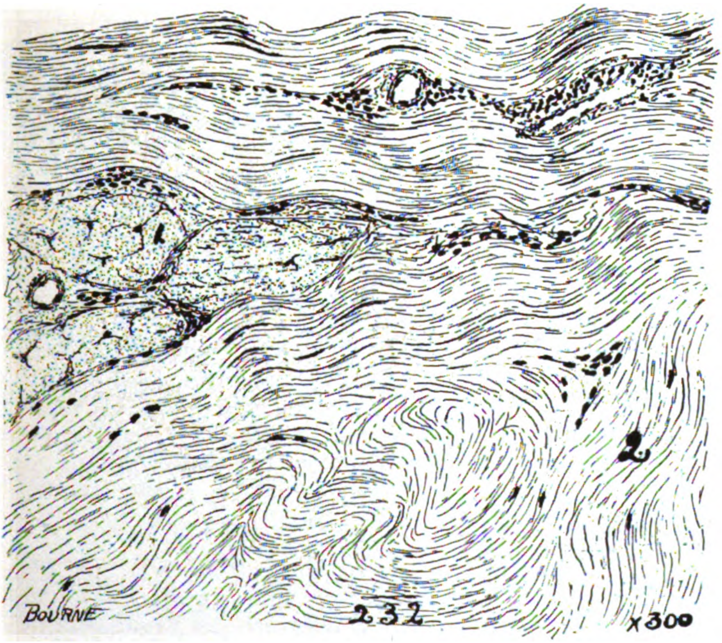
Leucocytes are common in tumors. Lymphocytes and polymorphonuclear leucocytes have been demonstrated in the blood and lymph channels, perivascular and intercellular spaces, and within the tumor cells. The cells and the manner in which they are assembled, the structure and arrangement of the intercellular substance, and the presence of the blood and lymph vessels indicate a common origin of tumor tissue and normal tissue.

Size.—Tumors are quite variable in size. They may become so large that they mechanically destroy life. An abdominal subserous lipoma, about the size of a wash-tub and weighing thirty-eight kilograms, was observed in an ox. A six-kilogram fibroma was removed from the inferior cervical region of an eighteen-kilogram dog. A twelve-kilogram chondroma was obtained from the sternum of a fifty-kilogram sheep. All of the above tumors were of sufficient size to mechanically inconvenience the animals afflicted, and in one case resulted fatally. From the enormously large tumors there are all gradations to those microscopic in size, miliary tumors. The size of tumors is determined to some extent by the amount of nourishment supplied, the kind of tissue they are composed of, and their location.

Shape.—The form of tumors is largely determined by location and the kind of tissue in which they occur. They may be spherical, ovoid, elliptoid, nodular, miliary, tubercular, fungoid, polypoid, tabular, elongated, cylindrical, etc. Where there is no resistance or only a slight resistance there is a tendency to sphericity. They may be regular or irregular, their outline may be smooth, nodular or even granular and in some cases the exact outline cannot be determined. Large tumors that in shape approach a sphere are designated as spherical, ovoid, elliptoid, etc. Those that vary in size from a pigeon egg to a small pea are spoken of as nodular tumors. Miliary tumors are small spherical growths varying from a small pea to those microscopic in size. Spherical or oval tumors within a tissue that projects outward causing an elevation in the tissue are known as tubercular tumors. Fungoid or projecting tumors are those that develop from the surface or sub-surface tissue, being attached to the normal tissue by a wide base. Polypoid tumors or polypi have the same origin and project as fungoid tumors, but are attached by means of a small pedicle. Tabular tumors are flat and usually develop beneath the surface and especially beneath fasciæ, tendons, ligaments.

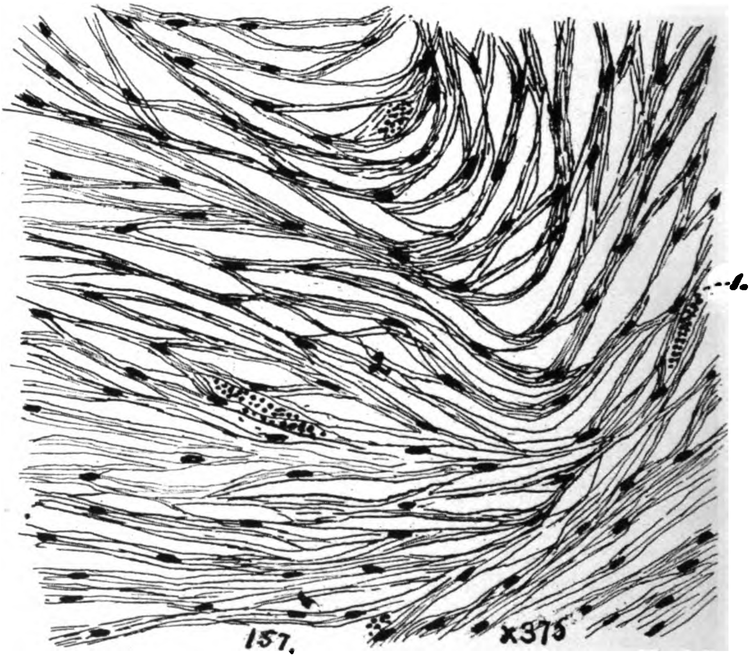
Color.—The color of tumors is dependent upon—first, the

I



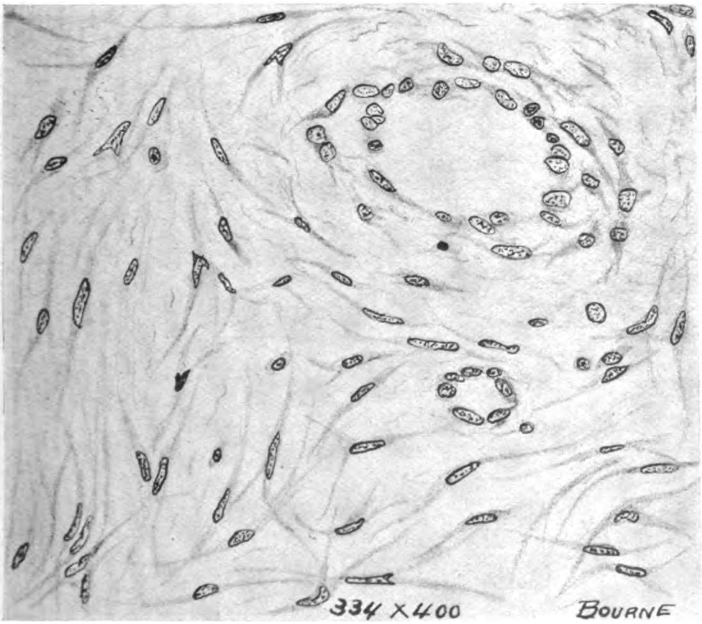
Section of a hard fibroma showing: 1, transverse section of bundles of fibres; 2, longitudinal section of bundles.

II



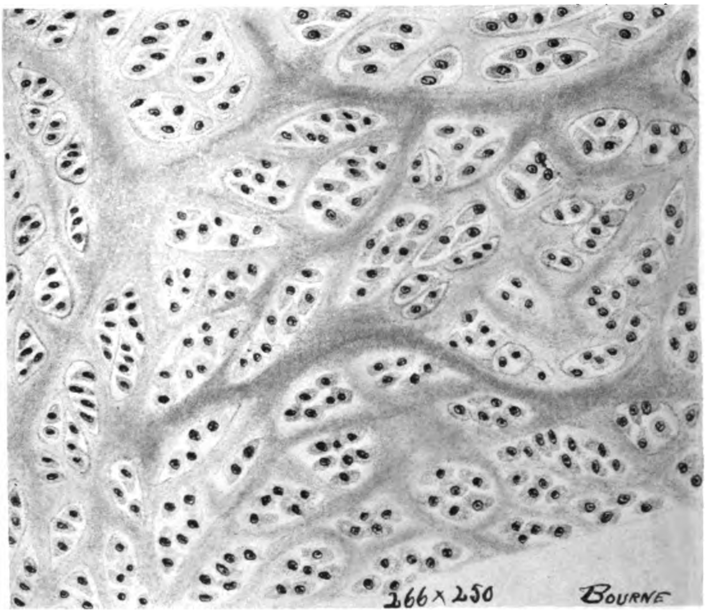
Section of a soft fibroma.

III



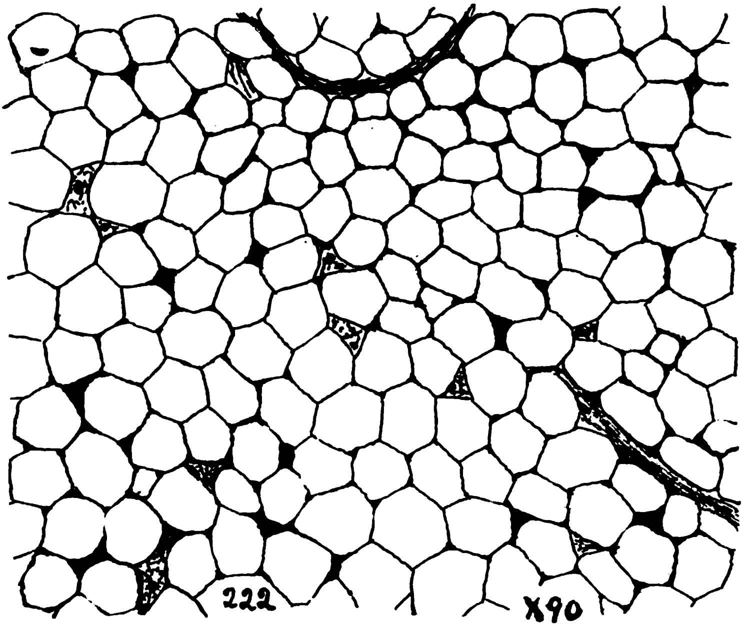
Section of myxoma showing stellate cells.

IV



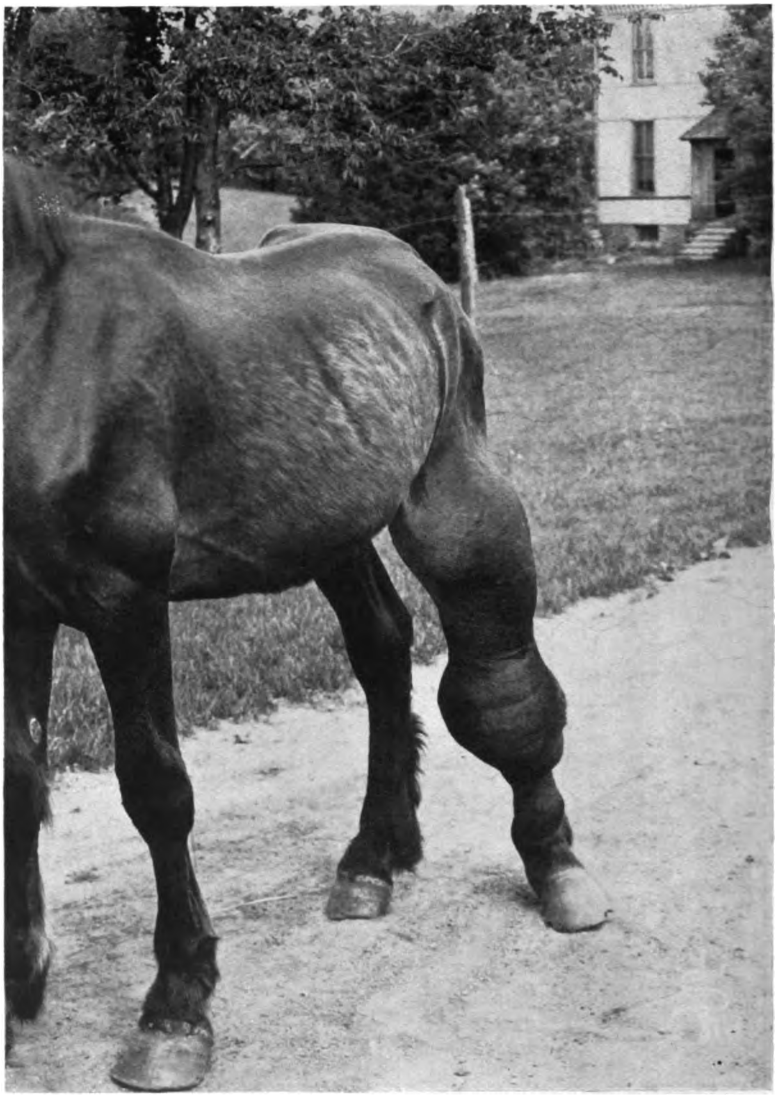
Section of chondroma showing lacunæ with inclosed cartilage cells.

V



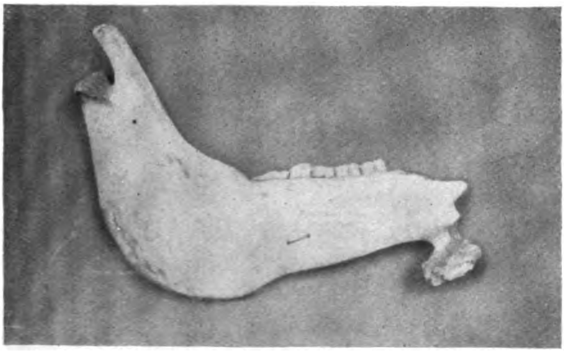
Section of lipoma showing framework of adipose cells.

VI



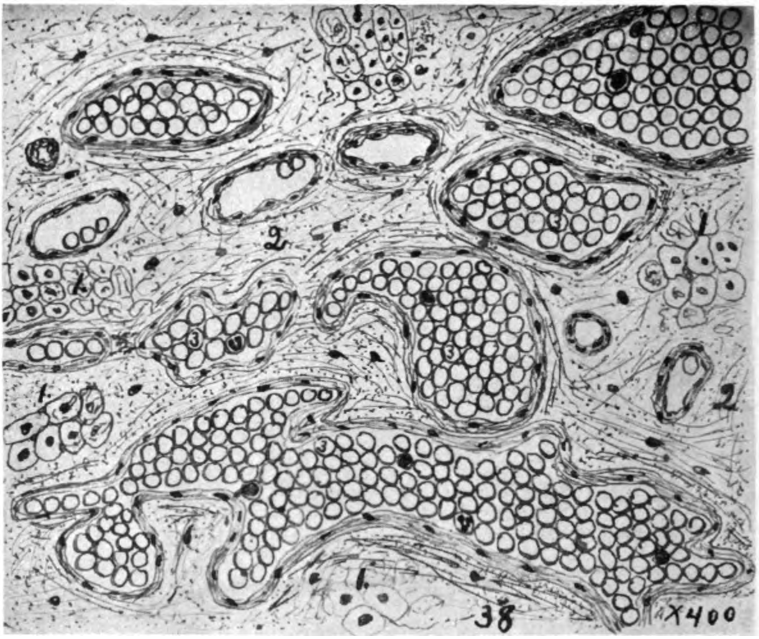
From photograph taken 6-20-'07 of a colt affected with a subcutaneous lipoma.
Photograph presented by J. H. McNeil.

VII



Pedunculated osseous tumor inferior maxilla. Horse.

VIII



Section of capillary hemangioma, liver, showing: 1, island of liver cells; 2, fibrous tissue; 3, blood cells filled with blood.

kind of tissue composing them; second, pigmentation; third, degeneration; and fourth, the amount of blood they contain. A rhabdomyoma is more intensely colored than a fibroma, provided that the blood supply is the same in both because of the hemaglobin in the muscular tissue. Melanomata and chloromata are tumors so classed because of the deposition of pigment in them. Tumors like normal tissues become changed in color, as a result of the various degenerations. Those having a limited blood supply are pale in color, while those having a large blood supply are highly colored. Hemorrhages may result in a deposition of hemoglobin or some of its derivations, thus giving the tumor a mottled appearance. Mottling may also result from an unequal blood supply.

Consistency.—Some tumors are soft and spongy, jelly-like, and from this type there are all variations up to those that are hard and resistant, bone-like. Their consistency is determined largely by the kind of tissue composing them and the secondary changes (degenerations) that affect them. Myxomata being largely composed of mucus are soft, fibromata are more resistant, and osteomata are bone-like. Chondromata are usually quite firm and resistant, but they may undergo mucoid degeneration and become soft and spongy. Colloid degeneration is rather common in carcinomata, rendering them glue-like in consistency. Occasionally a tumor becomes calcified as a result of calcareous infiltration

Number.—Tumors may be single, that is, a single one only occurring in the animal body. Single tumors are usually benign, although they may be malign. An animal may be afflicted with a great many tumors at the same time—multiple tumors. Tumors may become multiple by metastasis. Tumors resulting from metastasis are designated secondary and the original tumor primary. Multiple tumors may be malign, as sarcomata, carcinomata, etc., or they may be benign, *e.g.*, multiple fibromata. Tumors that recur after they have been removed are designated as recurrent tumors.

Growth.—Some tumors grow like an onion, there being a multiplication and accumulation of the central or internal cells, resulting in an interstitial expansion and an increase in the size of the tumor. Practically all benign tumors grow by interstitial expansion. Malign tumors grow by peripheral infiltration as well as by interstitial expansion. The extent of growth of all tumors is proportional to the amount of nourishment they receive and by the adjacent tissue-resistance. The relative amount of nourishment to tumor tissue and to normal tissue in the same body may be very unequal. Thus a tumor frequently receives an excessive amount of nourishment and grows rapidly, while the normal tissue in the same body is deprived of nourishment, resulting in its atrophy or degeneration and emaciation. The rate of growth is rather indefinite, as a rule; malign tumors grow more rapidly than benign.

Extension.—The manner of extension of the various tumors depends upon the migratory properties of the tumor cells and the relation and structure of the blood and lymph vessels. Tumors composed of embryonic cells extend more rapidly than those composed of adult cells because embryonic cells are plastic and they are to some extent capable of ameboid movement. Adult cells are fixed in their form and none of them excepting the leucocytes are migratory. The nutrient vessels of tumors are sometimes formed of tumor cells that are easily detachable, a structural peculiarity predisposing to tumor metastasis.

Benign tumors usually extend only by growth in continuity or contiguity. In fact, practically all tumors composed of adult tissues extend by pushing aside the normal tissue. Malign tumors are extended by blood, *e.g.*, sarcoma; by lymph, *e.g.*, carcinoma; or they pass from one point to another through natural channels as the digestive and respiratory tracts.

Summary.—Tumors may be extended (1) by growth in continuity, (2) by growth in contiguity, (3) by blood, (4) by lymph, (5) by natural channels other than the blood and lymph vessels.

Retrogressive Changes.—Tumors are subject to the same degenerative processes that normal tissues are. Hemorrhages, necrosis and degeneration are frequent in tumors because of the imperfectly formed and irregular distribution of the supplying vessels. The results of hemorrhage into tumors depend upon the quantity of blood and the secondary change in the extravasate. A tumor the size of a cocoanut would likely become necrotic if a vessel ruptured and a half a liter of blood escaped into the tumor tissue. A small quantity of extravasate when infected with putrefactive microörganisms as a rule results in necrosis of the tumor tissue. Necrosis is a sequel of obstructed circulation or results from the solvent action of metabolic products. Thus necrosis may be the result of thrombosis or embolism. Thrombic formation is especially prevalent because of the irregularities of the lining of the tumor vessels. Emboli are common, as they are frequently detached tumor cells. Circulation may also be obstructed by pressure of the tumor tissues, thus obstructing the efferent or afferent blood-vessels. Some metabolic products of tumors constantly dissolve the surface cells, resulting in ulceration, a common necrotic condition observed in tumors. Tumors may be invaded with pyogenic bacteria, resulting in suppuration.

Of the degenerations mucoid and colloid are the most common. Fatty degeneration and calcareous infiltration occur less frequently. Mucoid degeneration affects connective tissue and epithelial tissue tumors, occurring more frequently in the former. Colloid degeneration is found in epithelial tissue tumors.

A four-kilogram renal hypernephroma undergoing colloid degeneration was obtained on post-mortem examination of a three-year-old steer. Fatty degeneration usually succeeds necrosis in tumor tissue. Calcification of tumors is quite common. Pigmentation is more common in tumors than in normal tissue. Melanomata are tumors containing melanin that has been deposited in the tumor cells. Chloromata are tumors containing a green pigment. Hemoglobin, hematoidin and hemosiderin are frequently found in tumors after hemorrhage.

Clinically.—Tumors are benign or malign. Benign tumors are usually encapsulated, *i.e.*, they grow only by interstitial expansion; are composed of adult or matured tissue; have no tendency to recur when removed; and have only a mechanical effect upon the body in which they occur. Malign tumors are usually not encapsulated; they grow by peripheral infiltration; are usually composed of embryonic tissue; frequently recur when removed; and have a tendency to kill by absorption of the metabolic products which are deleterious to the body. Malign tumors of domestic animals are not as fatal as they are in the human. Many cases of sarcomata have been permanently relieved in the horse.

Cause.—There are some predisposing factors that are frequently involved in the development of tumors. Cadiot refers to a family of dogs in which the females were affected with carcinomata of the mammæ for two successive generations. Hereford cattle are more frequently affected with ocular tumors than any other breed. Injuries in which there is a destruction of the tissue surfaces predisposes to tumor formation.

The exciting causes of tumor formation have not been definitely determined and this accounts for their undetermined characteristics. Many theories have been advanced. Conheim advanced the idea that tumors were developed from misplaced embryonic cells, cell rests. This theory has received the support of many pathologists. It is in accord with the general biological law that every cell produces a cell like itself or " like begets like." The supporters of this theory have not proven it, but the opponents have not disproven it. All biologists recognize the complexity of embryonic development and are aware of the possibility of cells becoming entangled or misplaced during the formation period. Experiments have demonstrated the possibility of successfully transplanting tissue, both fetal and adult into a foreign location in the body. Transplanted fetal tissue, however, does not remain as such, but soon becomes mature tissue, whereas malignant tumor cells have no tendency to become matured. Transplanted tissue cells do not infiltrate the surrounding tissue nor form metastasis, but remain as distinct islands of cells.

The parasitic theory has been supported by a large number of scientists. No doubt malignant tumors resemble infectious diseases in that they extend by metastasis and produce similar effects. However, the uncertain transmission of tumors from one animal to another is certainly antagnostic to the parasitic theory. No one has produced a satisfactory proof of the isolation of any causative parasite. Bacteria were thought to be the active agent in tumor production by some authorities, and protozoa were claimed as the causative factor by others, and more recently the radical observers have proclaimed that yeasts were the cause. Some even claim that the tumor cells are parasites.

Varieties.—There is no satisfactory methods of classifying tumors. Some authors have attempted methods of classifying, but until more is known concerning them a classification is unwise. The following is an attempt at grouping them, but is in no way complete. They may be grouped as to:

1. Occurrence.
    - Primary—The original or first tumor.
    - Secondary—Metastatic tumors.
    - Recurrent—A newly developed tumor at the point in which one had been recently removed.

2. Structure.
   - Histoid—Simple tissue tumor.
   - Organoid—Organ-like tumor.
   - Teratoid—Mixture of various tissues resulting in a structure resembling an embryo.

3. Clinically.
   - Benign—No tendency to kill.
   - Malign—Having a tendency to kill.

FIBROMA.

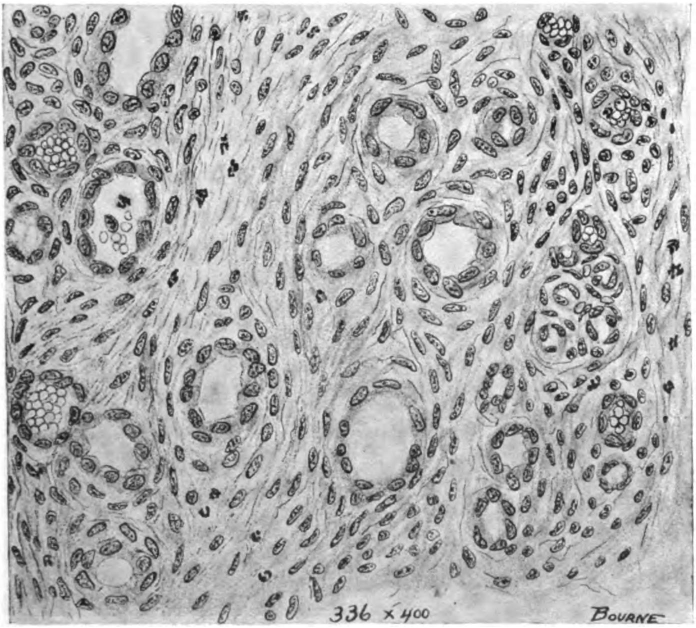
Fibromata are tumors composed of adult fibrous connective tissue. They occur in all animals. The skin and subcutaneous areolar tissue is the most frequent location of them, but no tissue is exempt. They are frequently found in the region of the sternum in the horse and ox, also in the ovary and uterus of the cow, in the perineal and elbow region of the dog. In the skin and subcutaneous tissue they usually appear as loose circumscribed nodular growths. Some fibromata have no well defined border or line of demarcation, but apparently diffuse through the tissue. This type, however, is rather rare, and possibly are not fibromata. They may become so large that their pressure produces atrophy, degeneration or necrosis of the skin covering them, or the surface epithelium may also produce sufficient new tissue to compensate for the increased surface. These tumors are usually single; that is, only one tumor occurring in the individual. They may be multiple. A horse was recently examined in which there were a large number of small cutaneous fibromata. They are variable in size, being so small in many instances that they are not observed in an ordinary examination. A fibroma may be so large that the diagnostician would mistake it for a malignant tumor, a hernia, cold abscess, etc. Their shape is as variable as their size. They may be oval, tabular, tubercular, nodular, and in fact, they may have any conceivable shape and contour.

If the skin or covering tissue is incised or dissected away, the tumor is usually found to be surrounded by a fibrous capsule, or, in rare instances, it may blend imperceptibly with the surrounding normal tissue. They are not difficult to remove in their entirety because of their encapsulation. In excision their blood supply is found to be disproportionate to their size. With the small or limited blood supply there is a tendency to a slow growth or degeneration and necrosis. With an excessive blood supply there may be rapid growth and perhaps frequent hemorrhages into the tumor tissue. If the excised tumor is sectioned and the cut surface examined with the unaided eye, it appears to be composed of compact bundles of fibrous connective tissue atypically arranged (hard fibroma) or of loosely arranged bands of fibrous connective tissue inclosing areolar spaces (soft fibroma). In color the section appears pearly white with dull areas in it, grayish-white, yellowish-white or pink, depending upon the compactness of the tissue, whether the bundles are cut longitudinal or transverse, and the amount of blood it contains. It is firm, dense and resistant, and in cutting there may be a creaking sound similar to that produced in cutting a tendon. They have little or no tendency to peripheral infiltration, but grow by central or interstitial expansion, mechanically pushing the contacting tissue aside.

If the tumor has degenerated or become necrotic quite a different picture than the above will be seen. It may be a mass of mucus as a result of mucoid degeneration. It may contain necrotic areas or the entire tumor may undergo necrosis, the necrotic tissue becoming liquefied, coagulated, caseated or calcified. Hemorrhage into the tumor tissue may give it a mottled appearance; the hemorrhagic spots may be red, yellowish-red or greenish-red, depending upon the changes in the hemoglobin.

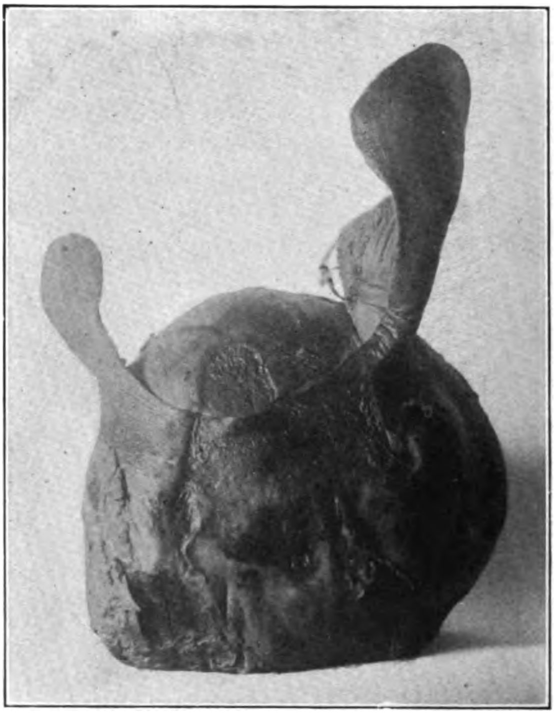
Microscopically the tumor tissue appears as white fibrous connective tissue, being composed of cells and a white fibrous intercellular substance. Cells are more prevalent in the rapidly growing tumors. The arrangement of the fibres varies and is the determining factor of the denseness of the tumor. A hard fibroma is made up of bundles of fibres extending in various directions and occupying practically the entire space, there being no interfunicular spaces. The bundles are compact masses of parallel, wavy fibres, with here and there a cell. Blood-vessels are few in number and may be absent (Cut 1). A soft fibroma is composed of small bundles or bands of fibrous tissue loosely arranged. Cells and blood-vessels are more numerous than in hard fibromata. The general appearance of a loose fibroma magnified one hundred diameters is very similar to areolar tissue, except yellow elastic tissue is absent in fibroma and is present in areolar tissue. All variations in the compactness of the fibrous tissue is found from the soft to the hard fibroma. In fact some sections indicate that a soft fibroma becomes a hard fibroma by an increase in the intercellular fibres.

IX



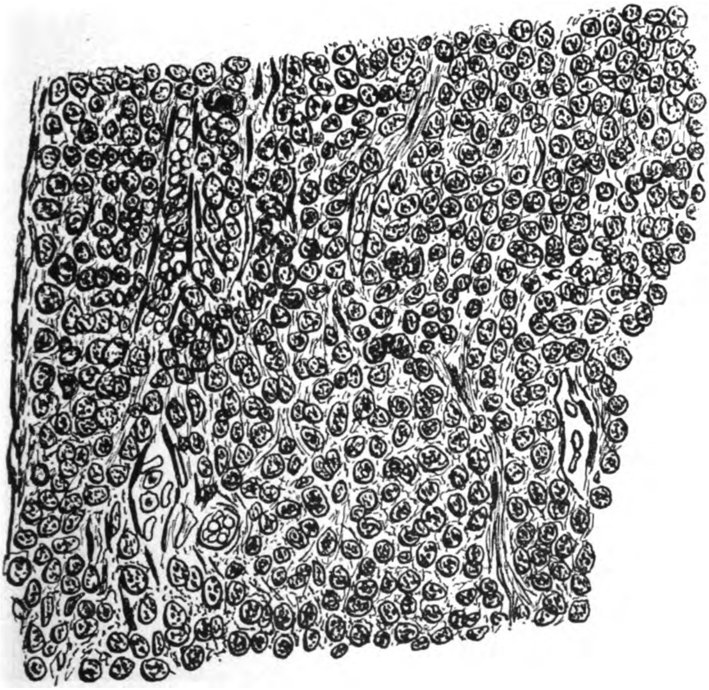
Section of hemangioma hypertrophicum showing an increase in the number of the vessels and an hypertrophy of their walls.

X



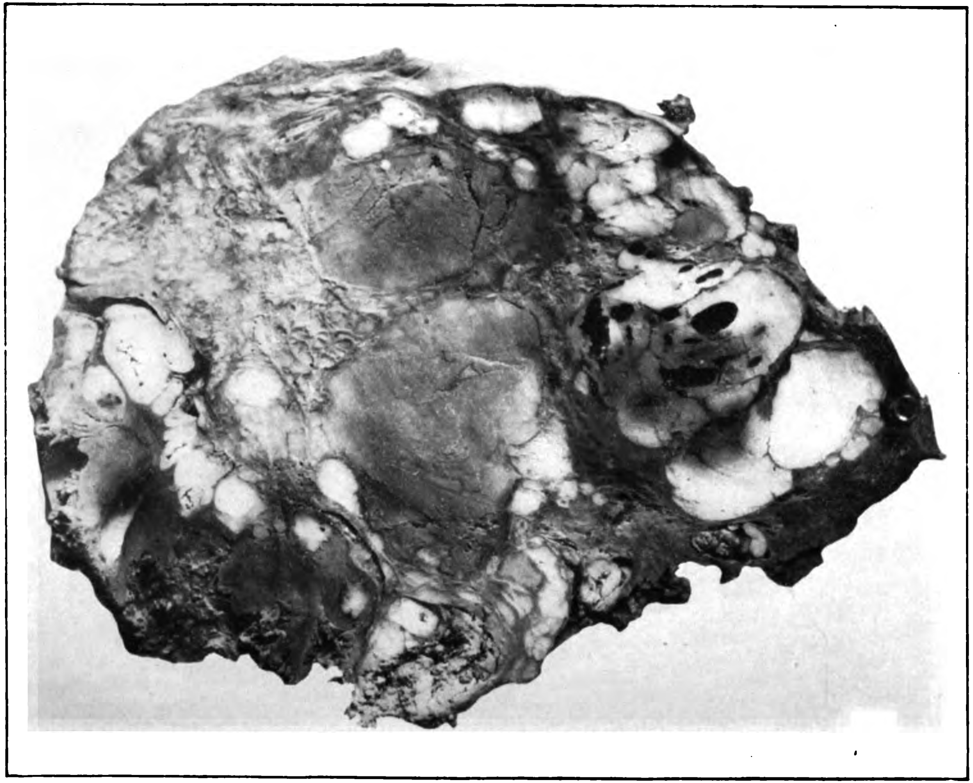
Photograph of spleen of dog affected with an hemangioma simplex.

XI



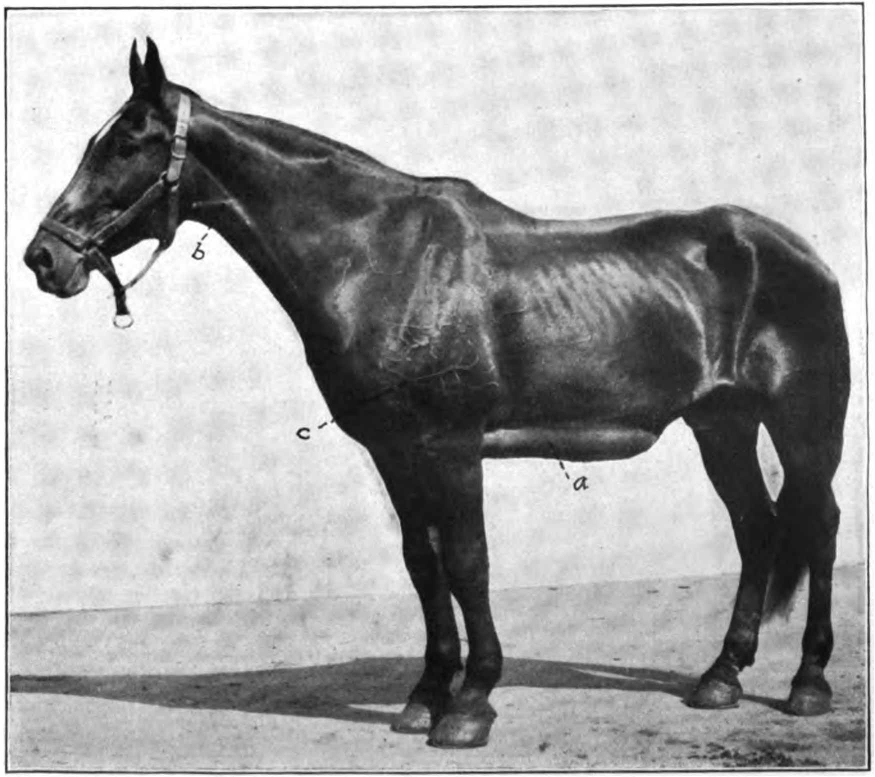
Showing sarcomatous cells and blood vessels.

XII



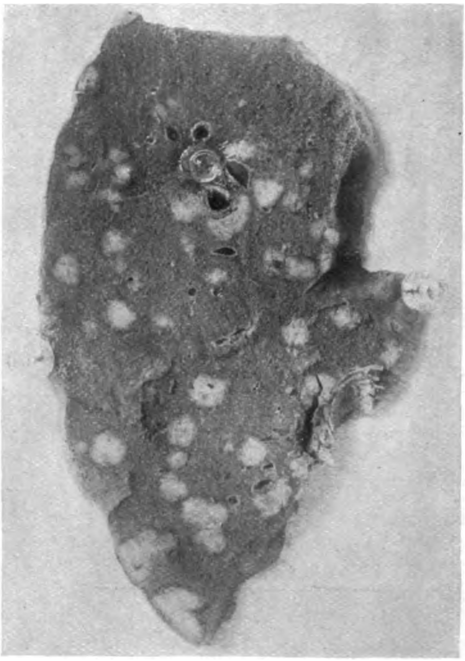
Section of tumor showing mottled appearance, a result of necrotic centres.

XIII



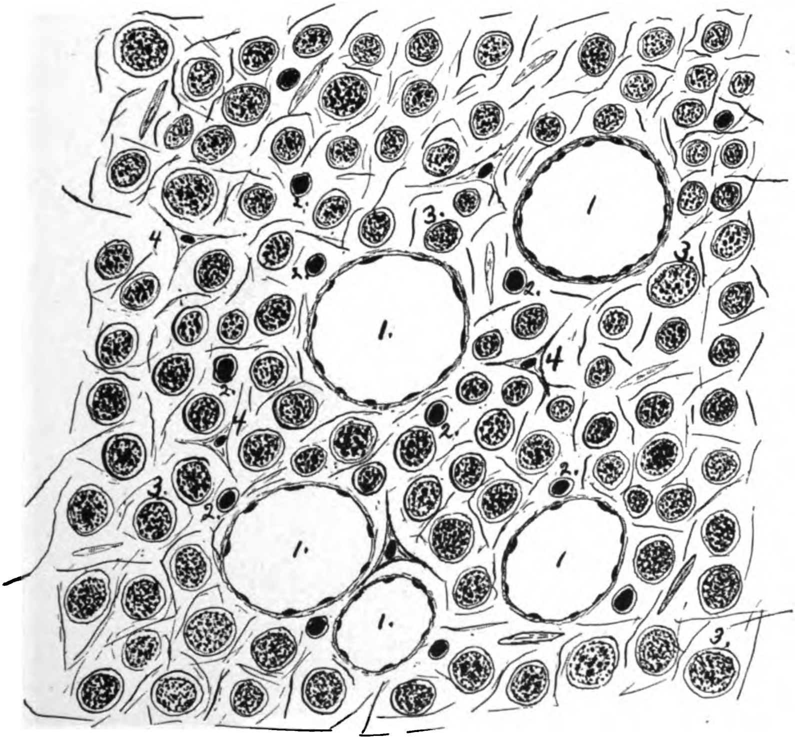
Photograph of a horse affected with sarcoma of the mediastinum resulting in obstructed circulation.

XIV



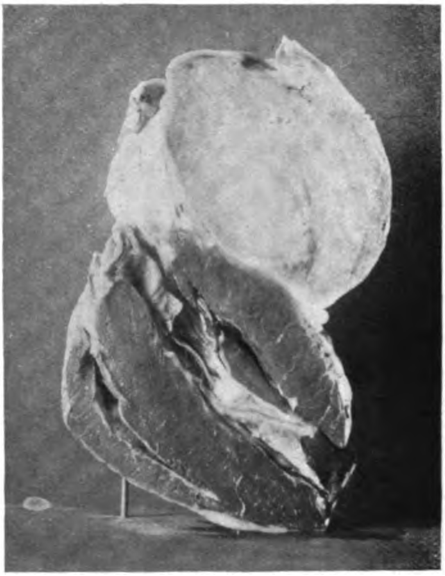
Photograph of a section of a horse's lung showing metastatic sarcomata.

XV



Section of a lympho sarcoma of a dog's omentum showing the lymph vessels and sarcomatous tissue.

XVI



Photograph of sheep's heart showing a lympho sarcoma of the pericardium.

Clinically fibromata are innocent tumors. Their rate of growth is relatively slow. They may cause a fatal termination by mechanically obstructing the lumen of a hollow organ, as the intestine, by pressure upon vital organs, as the brain, or they may become so large that the affected animal is unable to move about in search of its food; thus Kitt mentions a fibroma that weighed 178 kilograms. They do not extend by metastasis, neither do they recur when removed.

Fibromata can usually be differentiated from inflammatory new growths by the history of the case, fibromata having no defined cause and inflammatory new growths resulting from irritation. Microscopically, inflammatory new growths contain mitotic plasma cells and fixed connective tissue cells, and mitotis is rarely observed in fibromata. There is also an excessive blood supply in inflammatory growths. Actinomycotic and botriomycotic tissue are differentiated by the presence of the causative fungi. Spindle-cell sarcoma may be confounded with fibroma and is sometimes difficult to differentiate. Usually the sarcoma cells contain more protoplasm than the fibroma cells, and this may be used as a basis for differentiation. By a gross examination leiomyoma may be mistaken for fibroma, but the microscopic appearance of the nuclei is characteristic. The nucleus of fibroma cells are oval and those of the leiomyoma cells are rod-shaped. If the fibroma contains degenerated or necrotic centres the differentiation may be more difficult in gross section, but microscopic examination of the unchanged tumor tissue will be sufficient. When the entire tumor has degenerated or become necrotic diagnosis may be impossible. Fibromatous tissue may be found in other tumors or fibromata may become contaminated by permeation or infiltration of other tumor tissue as mucoid, sarcomatous, etc., resulting in a fibro-myxoma, fibro-sarcoma, etc. The first portion of the compound word denoting that the mixed tumor contains more of that tumor tissue. Thus a fibro-myxoma is a tumor composed of fibroma (fibrous connective tissue) and myxoma (mucoid connective tissue), the former predominating. Mixed tumors will be discussed after consideration of the simple tumors.

A keloid is a dense overgrowth of white fibrous connective tissues in a cicatrix. These growths are quite common in the negro, especially at the point of an injury, as a razor cut or ear puncture for an ear-ring, etc. Because of their frequency and extent they have been considered as tumors by some authors. They are not true tumors but rather an inflammatory new growth resulting from improper cicatrization in wounds. They are not common in the lower animals.

MYXOMA.

Myxomata are tumors composed of mucoid connective tissue. Purely myxomatous tumors are not very common, occurring more frequently in combination with other tumor tissue. They are usually found in connective tissue, but in no special location. They have been found in the heart, along nerve trunks, in the nostril, and a case has been recently investigated of a pure myxoma involving the entire orbital structures in a horse. These tumors are usually about the size of a hen's egg, rarely becoming very large, probably because of their destruction by degeneration. They are invariably single. They appear as semi-solid masses, surrounded by a fibrous capsule, and are usually dirty-white or gray in color. After they are removed and an incision made into them, a mucous or gelatinous ropy fluid escapes. The cut section appears as a glassy semi-transparent, semi-solid mass, and is very similar to Wharton's jelly. The escaped fluid will be found by chemical test to contain considerable mucin. Their blood supply is usually very meager, in fact some authors regard myxoma as a mucoid degeneration because of the limited blood supply.

Microscopically, a myxoma is composed of stellate cells, in which the cell processes are apparently continuous with the processes of adjacent cells. The cells have an oval nucleus. The spaces between the cells and cell processes are filled with mucus, which appears as a stringy gray substance that stains red with eosin. Some white fibres are occasionally observed, also blood-vessels (see Cut III). Myxoma are prone to degeneration, resulting in the formation of a cyst, or the fibrous capsule may become eroded, allowing the degenerated contents to escape into the surrounding tissue or upon a surface. If the degenerated contents escape it is usually absorbed. Cicatricial tissue is usually produced in the cavity or space occupied by the myxoma. Sub-surface myxomatous degenerated areas may become infected, resulting in abscess formation.

Clinically myxomata are benign tumors. They grow slowly by interstitial expansion, do not recur when removed, and extend only by continuity or contiguity.

These tumors are differentiated from mucoid degeneration, as the later contains no stellate cells, and there is usually some of the cells present in mucoid degeneration that are normally present in that area. Clinically it may at times be difficult to distinguish between mucus retention cysts and myxoma, but by the exploring needle the contents of the cyst can be evacuated and this will determine the nature of the mass.

CHONDROMA.

A chondroma is a cartilaginous tumor. They occur in cattle, sheep, dogs, horses and fowls. They are found most frequently in the location in which cartilage is normally found. The sternum seems to be a favorite location for their development, probably because of the frequent injuries of the sternal cartilage due to the fracture of ribs and other injuries. They not infrequently occur in other bones, possibly developing from islands of cartilage that have not ossified, or from marrow or periosteum. They also occur in glandular tissue as the thyroid, parotid, ovary and testicle, and a few cases have been reported of chondromata of the lung.

These tumors appear as hard, nodular, well-defined growths, unless they are undergoing degeneration, when they may be of the nature of cysts, or if their capsule is ruptured, they may be soft, spongy, diffuse masses. They are variable in size. A chondroma weighing 12 kilograms was obtained from the sternum of a sheep killed in a Kansas City abattoir. Another about the size of a pigeon's egg was found attached to the sternum of a small hen by a city meat inspector.

Their shape is very irregular. They are most frequently oval. As a rule they have a regular surface and they may be lobulated. They are usually separated from the surrounding tissue by the fibrous capsule, but they may be firmly adherent to the adjacent tissue. In cutting the tumor gives a resistance similar to cartilage and they may even be gritty because of calcification or ossification. The ablated tumor is bluish-white if it is a pure chondroma. Degenerated areas will vary in color according to the kind and degree of the degeneration. Necrotic centres appear dull gray or yellowish-white and white if calcified. If the tumor is mixed the color will vary according to the contaminating tumor tissue.

Chondromatous tissue is composed of cartilage cells and an intercellular substance. The cells are irregular in size and shape and the number found in each lacuna is more variable than in normal cartilage. The size, shape and arrangement of cells in different areas in the same tumor is variable. The cells are frequently degenerated, the nucleus fragmented and the cell membrane ruptured, allowing the cells to fuse as a homogenous mass. The lucanæ are not so distinct as in the normal cartilage, and their capsule may be absent. The intercellular substance is usually homogeneous, as in normal hyaline cartilage, or it may be fibrous, as in normal fibro-cartilage or elastic cartilage (Cut IV). The intercellular substance becomes fibrous towards the margin of the growth and finally forms a perichondrium. The cells may be arranged in rows near the perichondrium, but they are more likely to be irregularly distributed. The microscopic appearance of a degenerating, necrotic or mixed chondroma depends upon the kind and extent of the condition existing.

Clinically chondromata are usually benign, but they may become malignant because of their extent, and some surgeons have recorded cases of metastatic chondromata. These tumors are frequently lobulated and may be multiple. They have little tendency to recur when removed.

LIPOMA.

Lipomata are tumors composed of adipose tissue with a connective tissue framework that supports the vascular supply. They occur quite commonly in the horse, ox, and dog, but none of the domestic animals are exempt. They usually develop where adipose tissue normally exists, as the subcutum, submucosa and subserosa, omentum, etc. They may also occur in tissue that contains no adipose, as the liver, kidney and even the brain. They occur most frequently in the subcutaneous tissue in the horse; in the intestinal and omental subserosa of the ox and hog; subcutum and conjunctival submucosa in the dog; and the uterine submucosa of the sheep and the cow.

Lipomata are usually circumscribed, but they may be diffuse. Cut VI is a photograph of a two-year-old colt in which there is a diffuse subcutaneous lipoma of the left hind leg. These tumors may become enormous in size in the horse and ox, some cases having been reported of lipomata as large as a wash-tub and weighing 30 to 70 kilograms. In consistency these tumors may be firm and dense or soft and flabby. They are usually surrounded by a fibrous capsule, and in section those from the peritoneum and omentum, and are yellowish or white in color. Peritoneal, omental, submucus and subcutaneous lipomata have a smooth surface; intestinal lipomata are usually lobulated. Bands of connective tissue may divide the tumors into lobes or lobules of the connective tissue may be diffuse throughout the entire structure. The resistance in cutting a lipoma varies according to the quantity of fibrous connective tissue it contains. If osmic acid is applied to the free surface of the gross specimen it stains the adipose areas black and has no effect upon other tissue. Occasionally groups of adipose cells become necrotic and calcify, thus forming gritty areas. Complete necrosis with sloughing or calcification is not rare in the larger lipomata.

Microscopic sections closely resemble normal adipose tissue, except the cells may be larger and perhaps more irregular in shape. The adipose cells as in normal adipose tissue are supported by connective tissue cells and fibres (Cut V). The application of Sudan III and osmic acid gives further proof of the composition of the cells.

Lipomata may be multiple but they are typical benign tumors. They do not form metastasis. Death may result from the mechanical effects of them. A subserous lipoma produced a volvulus that terminated fatally in a horse in the Kansas City Veterinary College clinic. Large peritoneal or omental lipoma of the ox and dog frequently cause sufficient displacement of the abdominal organs to derange their function materially. Subcutaneous carpal lipomata in the horse may become so large that they mechanically interfere with locomotion. Lipomata may have a fibrinous infiltration and organization resulting in lipomatous elephantiasis.

OSTEOMA.

An osteoma is a new growth composed of osseous tissue. Pure osteomata are not common. They occur most frequently in relation with bones and usually at the union of osseous tissue developed from different ossifying centres. These tumors are quite common in mules, appearing as projecting pedunculated masses attached to the inferior maxilla (Cut VII). More rarely they are found in other organs, as the lung, parotid gland, mammary gland, etc. These tumors are usually small, rarely becoming as large as a cocoanut. They are hard, nodular, frequently lobulated masses and usually firmly attached to the surrounding tissue. It is possible that they are developed from osseous cells that have been misplaced in bone formation or from the osteogenetic layer of the periosteum. When they develop adjacent to preëxisting bone the periosteum or endosteum surrounds them. Those osteomata developing in other structure than bone are surrounded by a distinct membrane that is usually very similar to periosteum. Osteomata may be classified as: (1) Hard, ivory or eburnated, and (2) soft, spongy or cancellous. Either of the foregoing classes may be homologous or heterologous. Homologous osteomata occur in bony structures and may be an exostosis or an enostosis. Hetrologous osteomata occur in other tissue than bone.

Hard, ivory or eburnated osteomata are structurally very similar to the compact osseous tissue of a long bone. Haversian systems may be present or they may be absent. If the Haversian systems are present they are irregularly arranged and are approximately perpendicular to the surface of the related bone. If the Haversian systems are absent the tumor is composed of superimposed lamellæ like the outer circumferential lamellæ of the shaft of a long bone.

Soft, spongy or cancellous osteomata are surrounded by a periostoid membrane. In structure they are similar to cancellous osseous tissue. The marrow spaces may be occupied by tissue that is structurally identical to red marrow or they may be filled with sarcomatous tissue, fibrous connective tissue, etc. The blood-vessels are usually normal in structure and their distribution is through Haversian canals in the hard osteoma or the spaces in the soft osteoma.

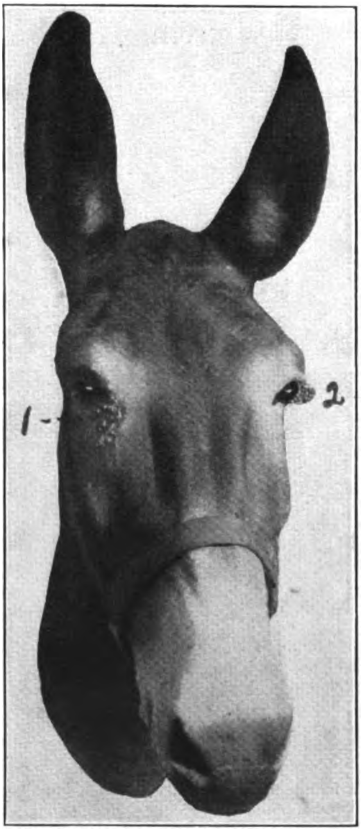
Osteomata are invariably single; do not recur when removed; have no tendency to form metatasis, and hence are benign.

They should be differentiated from (1) ossification of inflammatory new growths as ringbone, spavin, myositis ossificans, etc.; (2) hyperplasia of osseous tissue; (3) ossification of tumor tissue as fibroma, chondroma, etc.; (4) metaplasia in which osseous tissue is the end product; (5) calcification.

GLIOMA.

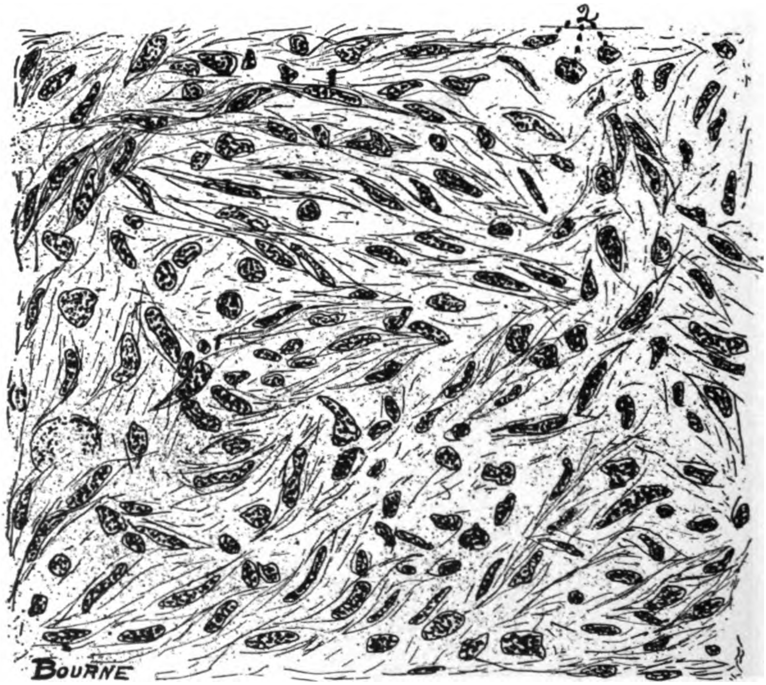
A glioma is a tumor composed of supporting cells (neuroglia cells) of the tissue of the central nervous system. Gliomata have

XVII



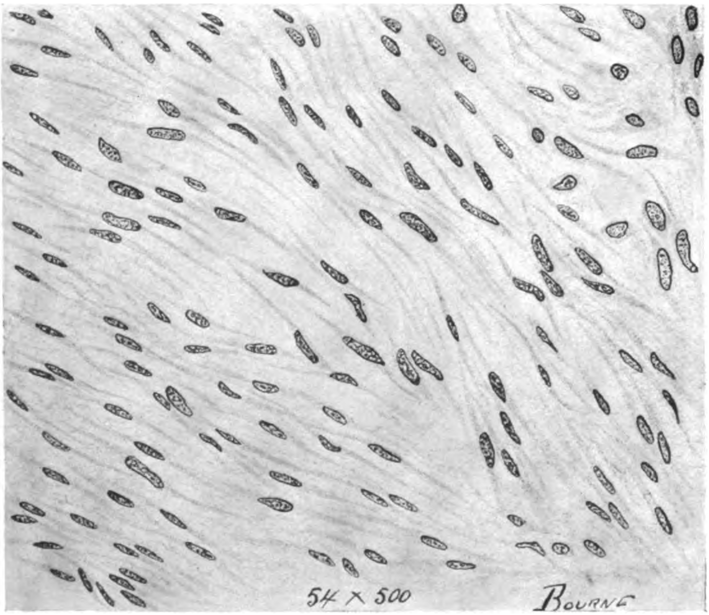
Photograph of a mule affected with a spindle cell sarcoma of the inferior eyelid.

XVIII



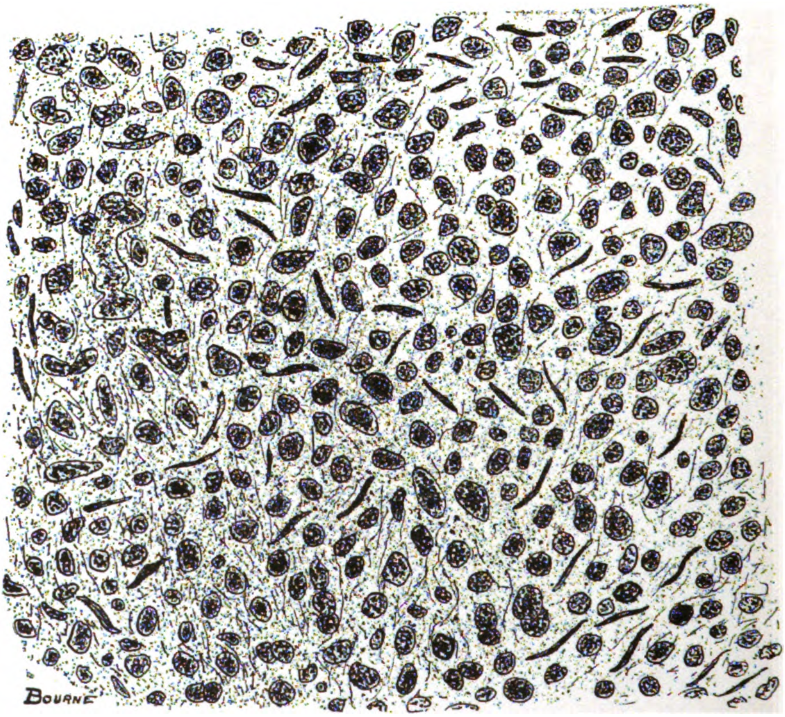
Section from spindle cell sarcoma of a mule's eyelid.

XIX



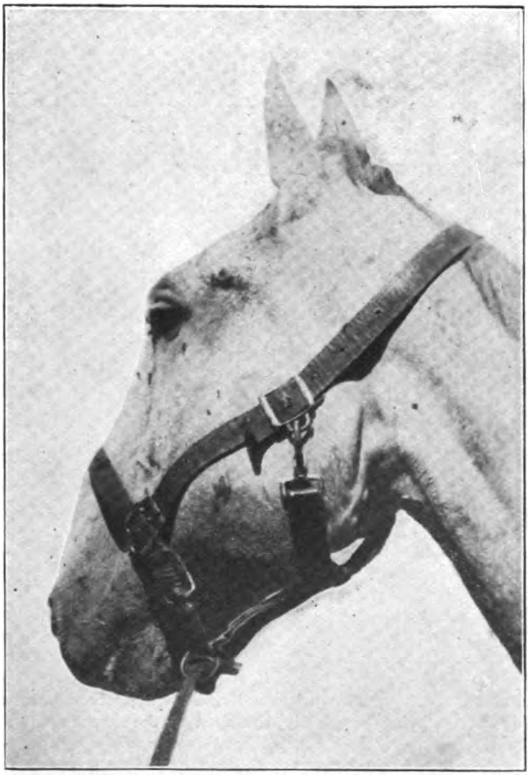
Section from spindle cell sarcoma of a mule's eyelid.

XX



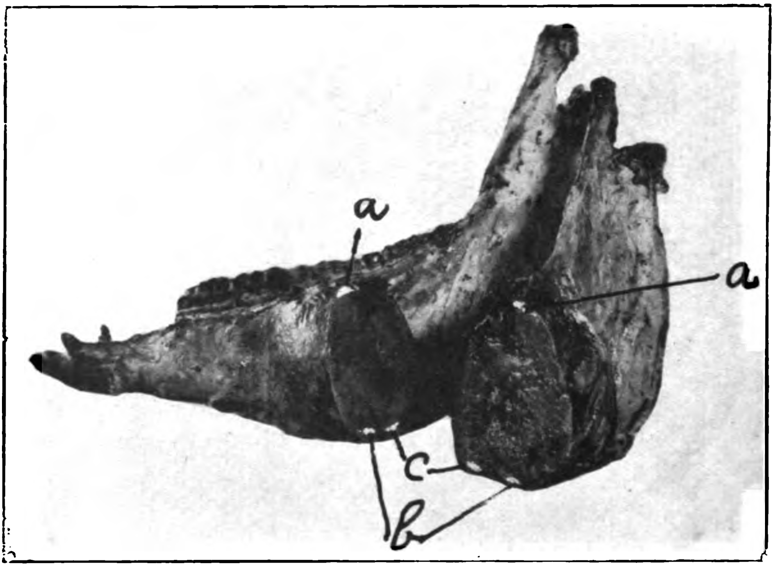
Section of a mixed cell sarcoma of the inferior maxilla of a horse.

XXI



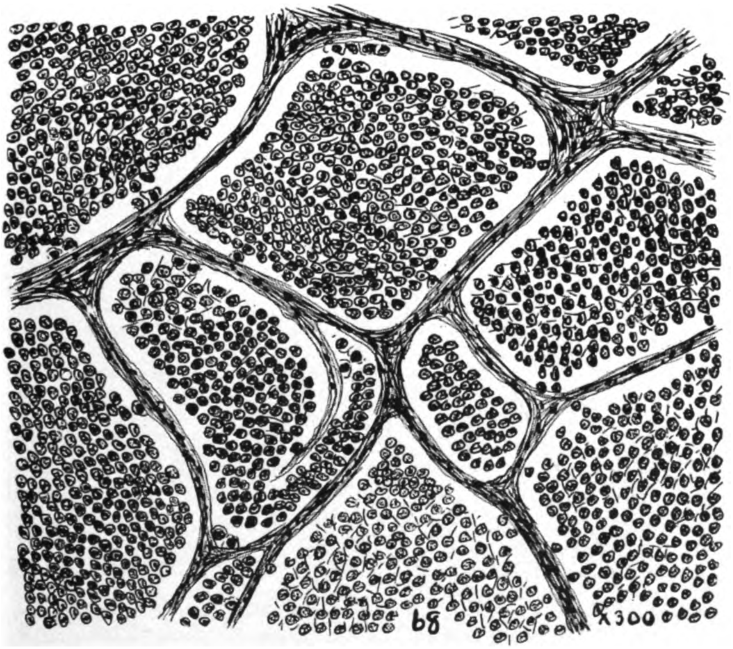
Photograph of horse's head affected with mixed cell sarcoma, a microscopic section of which is shown in cut XV.

XXII



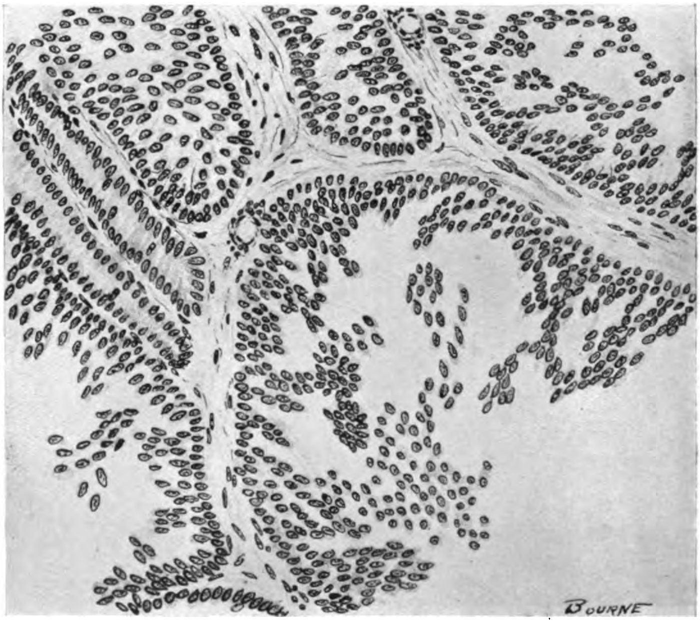
Photograph of maxilla of horse shown in cut XXI showing 3 bony points: the remainder of the maxilla being completely destroyed by the sarcomatous tissue.

XXIII



Section of alveolar sarcoma from ovary of heifer showing alveoli filled with sarcomatous cells.

XXIV



Section of endothelioma from a bull's testicle. Note the bands of connective tissue and arrangement of cells.

been observed only two or three times in the domestic animals. They usually have their origin in the gray matter near the central canal of the spinal cord or in the gray matter of the cerebrum. They do not become large and they are usually not encapsulated. They are composed of cells that are very similar to normal neuroglia cells. The glioma cells may be slightly larger than neuroglia cells but they have the fibre-like processes characteristic of them.

These tumors do not form metastasis but are likely to produce a fatal termination by pressure upon nerve centres.

NEUROMA.

Neuromata are nerve tissue tumors. They are exceedingly rare. They occur in connection with ganglionic cells and most frequently those of the sympathetic ganglia, although they may occur in the brain. They appear as nodular growths varying from the size of a pin head to that of an apple. They are gray or white in color, rather firm, and usually surrounded by a capsule. Irregularly shaped ganglionic cells with some nerve fibres constitute their minute structure.

These tumors should be differentiated first from the so-called "amputation neuromata," which are simply an entangled mass of regenerated axones and are not tumors, second from fibromata that develop from the perineurium or endoneurium of a nerve trunk.

Neuromata may be multiple but they are benign.

ANGIOMA.

This is a group of tumors composed of (1) hemangiomata, (2) lymphangiomata. These are vessel tumors that are developed independently of preëxisting vessels. But it is frequently impossible to determine whether the mass of vessels is a result of excessive growth of the preëxisting vessels (hyperplasia) or whether they are newly-formed vessels.

Hemangiomata are blood-vessel tumors. They are found most frequently in the skin in the human and they may occur in the skin in domestic animals, but are not often observed because of the pigmentation of the skin in these animals. They are found most frequently in the liver and the spleen of the ox, dog, horse and sheep (Cut X). One case has been observed in the subcutum of the horse. Hemangiomata may be subdivided into four varieties.

1. Hemangioma simplex (capillary telangiectases) or those tumors in which there is an excess of capillary vessels that are considerably enlarged or dilated (Cut VIII). The vessel wall is usually altered in structure, the endothelial cells are larger and the perivascular tissue more dense. These are quite common in the liver of the ox where they appear as irregular blood spots, red or purplish in color.

2. Cavernous hemangioma (hemangioma cavernosum) is a tumor composed of spongy tissue similar to erectile tissue. The cavernous spaces are filled with blood, thus coloring the tumor red or bluish-red. These tumors are found most frequently in the liver and spleen. An ox liver containing cavernous spaces as large as a hen's egg was presented to the Kansas City Veterinary College Museum. The caverns contained parietal thrombi. A lobulated enlargement in the spleen of the dog was found to be a cavernous hemangioma. The spaces are lined by endothelium that is supported by a very limited amount of white fibrous connective tissue, yellow elastic tissue being practically absent.

3. Hemangioma hypertrophicum is a blood-vessel tumor composed of masses of relatively small vessels, in which the vessel walls are hypertrophied. One of these tumors occurring in the subcutaneous tissue of the metacarpal region of the horse was recently observed. It appeared as a mass beneath the skin and was about the size of a hen's egg. Pulsations could be observed and by palpation they were quite distinct. The tumor when removed was a tangled mass of blood-vessels. The vessels had comparatively small openings. Microscopically the vessel walls were found to be hypertrophied. The vessels were held together by fibrous connective tissue (Cut IX).

4. A cirsoid aneurism is a tumor composed of dilated and enlarged tortuous arteries. This variety of hemangiomata has not been observed in the domestic animals by the writer.

Lymphangiomata are tumors composed of newly-formed lymphatic vessels. These tumors are not common; in fact, only one or two cases have been reported by veterinarians. These tumors may be conveniently divided into capillary and cavernous.

Angiomata are usually benign tumors, although they may by rupture produce fatal hemorrhage.

MYOMA.

Myomata are muscle tumors. They are divided into two classes: 1. Leiomyomata or the smooth muscle tumors. 2. Rhabdomyomata or the striated voluntary muscle tumors. Myomata are rare in the lower animals. Over 125 different tumors have been studied in the pathologic laboratory of the Kansas City Veterinary College and not a single myoma has been found. They are found occasionally in the human.

Leiomyomata are found most frequently in those locations in which involuntary muscle tissue normally exists, as the uterus, bladder, intestine, etc. They are nodular or diffuse, dense, pale pink masses appearing very similar to fibromata. Microscopically they are composed of miscellaneously arranged involuntary muscle cells. They differ from fibromata in that the muscle cells are thicker and usually not as long as the fibres of fibromata. Frequently they are combined with fibromata forming a leiomyofibroma, making the diagnosis more difficult. Leiomyoma cells may be very similar to the cells of a spindle-celled sarcoma, but the nucleus of the former is long and rod-shaped while the nucleus of the latter is oval in shape, a characteristic sufficient for diagnosis.

Rhabdomyomata have been found in the kidney, ovary and testicle. They are probably the result of the development of misplaced embryonic myoblasts. These tumors are usually pale in color. In microscopic section the cells are irregularly striated, variable in shape and arrangement. These tumors are benign.

SARCOMA.

A sarcoma is a tumor composed of embryonic connective tissue cells. The cells have no tendency to become mature but constantly appear as undifferentiated embryonic cells. This group of tumors occurs frequently in all domestic animals. They have no predilection for tissue or location. They are variable in size and shape. They may be circumscribed but are more frequently diffuse. Metastases are frequent in the lungs, liver and kidney. Metastatic sarcomata are usually circumscribed.

Sub-surface sarcomata may produce necrosis of the surface tissue, the tumor projecting as a red granular mass, appearing very similar to exuberant granulation. The surface tissue may not be destroyed, the tumor appearing as a sub-surface nodule or diffuse mass. Some sarcomata are encapsulated and are easily ennucleated, but the malignant varieties have no capsule and it is impossible to differentiate the surrounding tissue from the tumor tissue. Sarcomatous tissue may be soft and spongy or hard and dense, depending upon the extent of the intercellular substance and the kind of cells composing it. In color they vary from gray or white to pink and may be mottled, depending upon hemorrhage, pigment, deposit, etc. (Cut XII).

The microscopic appearance varies with the different varieties, but in general they are composed of embryonic cells having a limited amount of intercellular substance between all cells. The cells may be round, spindle, mixed, or myeloid, and the intercellular substance may be mucus, fibrous, cartilaginous or osseous. The cells contain a large centrally located ovoid nucleus. The nucleus occupies practically the entire cell body. Mitotic figures are common in rapidly growing sarcomata. Frequently there is multipolar mitotic figures indicating the possible division of a cell into three or more daughter cells. Karyolisis or nuclear fragmentation is well marked in those cells that are centrally located in the tumor in degenerating centres, and in cells of sarcomata that are not growing rapidly. The portion of the cell body not occupied by the nucleus is composed of undifferentiated protoplasm. The intercellular substance varies in appearance according to its composition. An abundance of capillaries and small blood-vessels are found in sarcomata. The blood-vessels may be normal in structure or they may be infiltrated with sarcomatous tissue, and in some cases the blood flows through channels formed by sarcoma cells. Hemorrhage is of frequent occurrence in sarcomata. The blood-vessels have no regularity in their distribution, a structural peculiarity frequently resulting in degeneration and necrosis. Lymphatic spaces and vessels are absent in sarcoma excepting lympho-sarcoma, unless entangled during their development. Nervous tissue has not been demonstrated as a distinct entity in sarcomata. There are usually many leucocytes and frequently plasma cells in sarcomatous tissue. The plasma cells may produce the intercellular structures of sarcoma or they may become adult connective tissue cells and produce fibrous connective tissue.

The rapid development and the irregular distribution of blood-vessels predispose sarcomata to destructive processes. Mucoid degeneration frequently occurs, and may result in the complete destruction of the tumor. Necrosis is also quite common, and suppurative conditions are not rare. If the normal tissues are eroded, exposing the tumor tissue, septic infection is common and sometimes results fatally.

This group of tumors may be classified, according to their cellular elements, as (1) round-cell sarcoma, (2) spindle-cell sarcoma, and (3) myeloid-cell sarcoma.

Round-cell sarcomata are those composed of round cells (spherical cells) primarily. This variety is rather common, sixteen cases having been investigated by the writer in the past three years. They develop in any tissue and are as a rule the most malignant tumors of this entire group. They are soft, spongy, and usually quite vascular, and are not as a rule encapsulated.

The cells of this variety structurally approximate the embryonic epithelial cells more closely than any of the other types. According to the size of the cells two classes may be recognized, viz.: small and large. However, there is no distinct line between the two classes. The small round cells are about the size of lymphocytes and the large round cells are as large and sometimes much larger than mononuclear leucocytes. The nucleus of this type of sarcoma cells are relatively much larger than the nucleus of lymphocytes or leucocytes; in fact, the nucleus occupies practically all of the entire cell body (Cut XI). The intercellular substance is very limited and is usually mucus or reticular. Blood-vessels are usually numerous and their walls are frequently formed by sarcomatous cells. Metastatic growths are frequent in this type. Cut XIV is from a photograph of the lung of a horse, showing metastatic round-celled sarcomata. The primary tumor involved the eye-ball and finally destroyed the soft structures of the entire orbit. Two or three metastatic tumors were also observed in the liver. Cut XIII represents a horse in which there was an extensive sarcomatous formation in the thoracic cavity, involving the mediastium, pericardium, pleura and some smaller nodules in the lung. The lung nodules were no doubt metastatic formations. Because of their tendency to form metastases and the rapid peripheral infiltration these tumors usually cause a fatal termination.

Lymphosarcomata are a variety of round-celled sarcoma. They are called lymphomata by some authors. They are quite common in all domestic animals. These tumors have their origin in lymphoid tissue and are extended by the lymph. Two cases in the ox have been studied in which the primary lesion was in the wall of the abomasum. One case of generalized lymphosarcoma has been observed in a chicken. A pericardial lymphosarcoma was found in a post-mortem examination of a sheep (Cut XV). An omental lymphosarcoma in a dog was reported in the *American Veterinary Review,* December, 1905. The color, consistency and size of lymphosarcomata is quite variable.

Microscopically these tumors are found to be composed of lymphoid cells. The tumor cells are supported by stellate cells. Lymph vessels are usually quite numerous and their structure is similar, if not identical, to normal lymph vessels. The stellate supporting cells and the presence of lymph vessels are the distinguishing characteristics of lymphosarcomata (Cut XVI). There is no leucocytosis in animals affected with lymphosarcomata and there is a marked leucocytosis in leukemia.

These tumors are malignant. They form metastases through the lymph and blood. They are usually surrounded by a very thin capsule.

Spindle-Cell Sarcomata.—These tumors are composed of spindle-shaped cells. They are more firm and dense than the round-cell sarcomata. These tumors are not rare. They occur more frequently in connection with the skin or subcutum. Some of the resistant and incurable cases of fistulous withers are spindle-celled sarcomata A collar boil that did not respond to treatment was found to be a spindle-cell sarcoma. These tumors are common in the eyelids of horses and mules and are sometimes quite resistant to surgical interference (Cut XVII). The cells vary from short, thick fusiform or spindle-shaped cells to elongated fibre-like cells (Cut XVIII). Spindle cells are more matured than the cells of round-cell sarcoma. Round cells have no tendency to become spindle cells, neither do spindle cells become either round cells or matured connective tissue cells. The cells in spindle-cell sarcomata have no definite arrangement but extend in all directions. In microscopic section some cells are cut transversely, others obliquely, and still others longitudinally. The nucleus is centrally located and is usually spherical or oval in shape, and is not as large in proportion to the size of the cell as the nucleus of the round cells (Cut XV). Some authors have suggested a classification of this group into large and small-celled varieties. The cells are usually held together by reticular connective tissue. The reticular tissue may be demonstrated in sections in which the sarcoma cells have been dissolved out by acetic acid. The density of the tumor depends upon the relative quantity of protoplasm the cells contain and the amount of intercellular material. A tumor composed of short, thick spindles is less dense than one composed of fibre-like cells. Blood-vessels usually have normal vessel walls and are not as numerous as in round-cell sarcomata.

These tumors are usually encapsulated. They rarely form metastases and are in general not as malignant as the round-cell variety. They may be mistaken for fibromata, but a careful study of a microscopic section is usually sufficient for differentiation. Fibromata contain no elements that appear like transverse sections of spindle cells. Leiomyoma may be differentiated by the shape of the nucleus and the selective action of stain as picrofuchsin.

Myeloid-Cell Sarcoma (Giant-Cell Sarcoma).—This is a variety of sarcoma characterized by the presence of myeloid or giant cells. Surgeons and pathologists frequently find myeloid sarcomata in man, but they are rare in domestic animals. They are invariably found in relation to, or in connection with, bone-marrow, or more rarely in relation with periosteum. They frequently contain cartilaginous, osseous or calcareous centres.

Microscopically they are composed of myeloid cells and round or spindle cells. The myeloid cells are the distinguishing elements of this variety of sarcoma. The size of the myeloid cells is variable, they frequently being 80 to 100 microns in diameter and have an irregular outline, their shape varying from a sphere to an elongated mass. Their protoplasm may be quite granular or almost clear. They have many nuclei—150 being observed in one cell. The nuclei have no definite arrangement but occur miscellaneously throughout the entire cell body. The round and spindle cells are like those occurring in round and spindle-cell sarcoma. There may be an excess of one or the other or they may be equal in number. The intercellular substance varies from mucus to calcareous. There is usually an excessive blood supply. The blood-vessel walls are usually normal in structure. Degeneration is of frequent occurrence in myeloid sarcomata and necrosis and calcification are also common.

These tumors may not be completely encapsulated. There is always a tendency for them to be circumscribed. They are the least malignant of all sarcomata. They rarely form metastases.

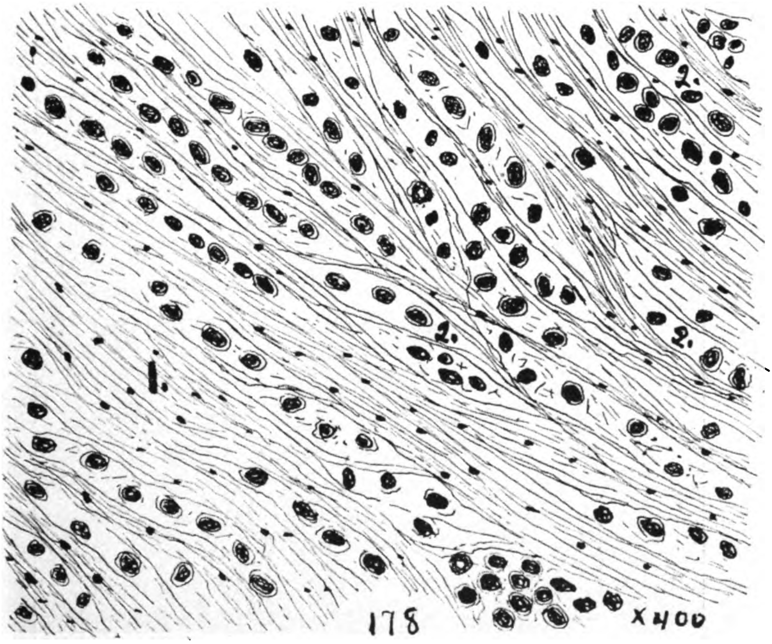
Mixed-Cell Sarcoma.—This is a variety of sarcoma characterized by the presence of variously shaped cells, as round, spindle and even stellate cells have been observed. This variety is not as common as either the round-cell or spindle-cell varieties. They have been observed in the horse, hog and ox, but no doubt they occur in all domestic animals. They affect bone, glandular tissue, meninges of the brain, and in fact, no tissue is exempt. An interesting case of mixed-cell sarcoma of the inferior maxilla of a horse was described in the December *Veterinary Review* for 1905. These tumors frequently degenerate and become necrotic. Microscopically they are composed of round cells and spindle cells that are identical in structure to those described in the discussion of round-cell and spindle-cell sarcoma (Cut XX). Stellate cells may be present, and are very similar in structure to mucoid connective tissue cells. The cellular elements are supported by reticular tissue or by fibrous connective tissue. The number of blood-vessels is variable. There is an excess of vessels in those varieties that are made up principally of round cells and in those varieties that have a limited amount of intercellular substance. The vessel walls may be normal or they may be composed of sarcomatous tissue. Degenerated or necrotic changes in the tissue necessarily alter the microscropic appearance.

These tumors are usually diffuse; that is, they are not encapsulated. They form metastases, and hence are malignant.

Alveolar Sarcoma.—This is a sarcoma characterized by the arrangement of the sarcoma cells into groups or nests. They are occassionally found on domestic animals, especially in the ox and hog. The reproductive glands, ovary and testicle, are the structures most frequently invaded by them. They may become quite large; an alveolar sarcoma obtained from the ovary of a heifer weighed 15 kilograms and was about 20 cm. in diameter.

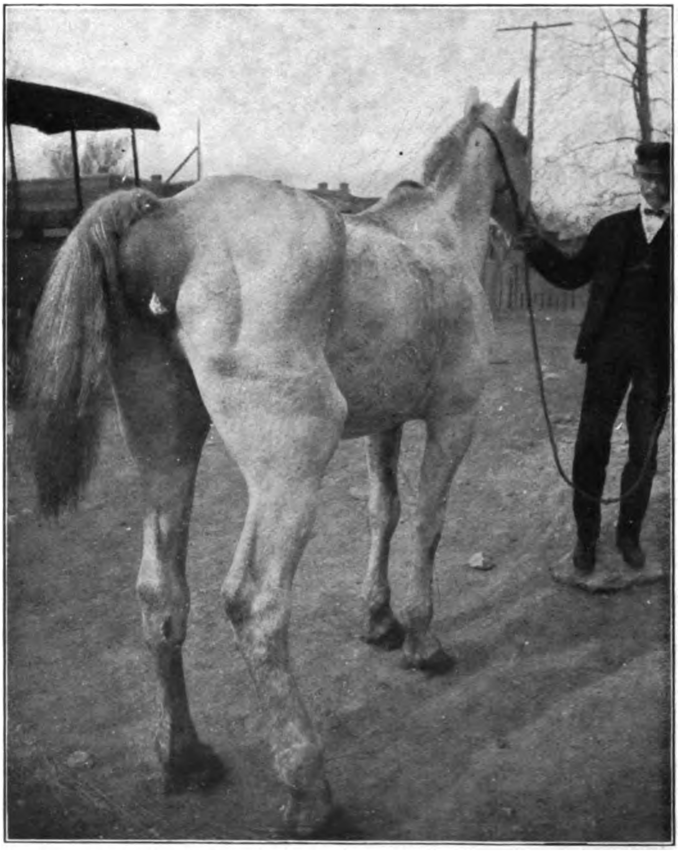
Microscopically the cells are usually round, although they may be spindle-shaped. The stroma of the tumor is composed of two portions. One portion is usually composed of spindle cells which are collected into dense bands which extend in various directions, forming alveoli; hence the name alveolar. The other portion of the stroma is intercellular and corresponds to that of the round-cell sarcoma (Cut XXIII). The arrangement of the cells into nests is suggestive of carcinoma, but the differentiation is not difficult and depends upon first, the presence of intercellular substance between the cells in sarcoma and its absence between the cells in carcinoma; second, sarcoma cells are embryonic connective tissue cells and hence contain a relatively large nucleus in pro-

XXV



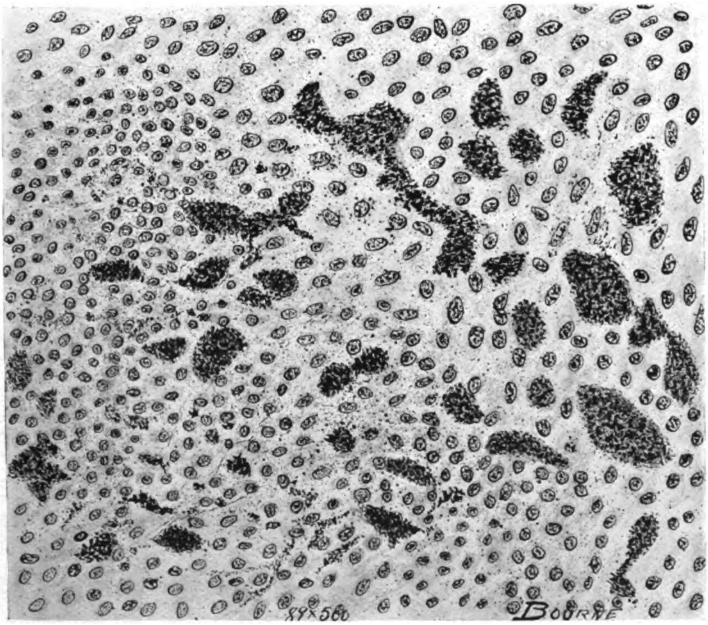
Section of a fibro-sarcoma from the commissure of the mouth of a horse, showing: 1, fibrous tissue; 2, sarcomatous tissue.

XXVI



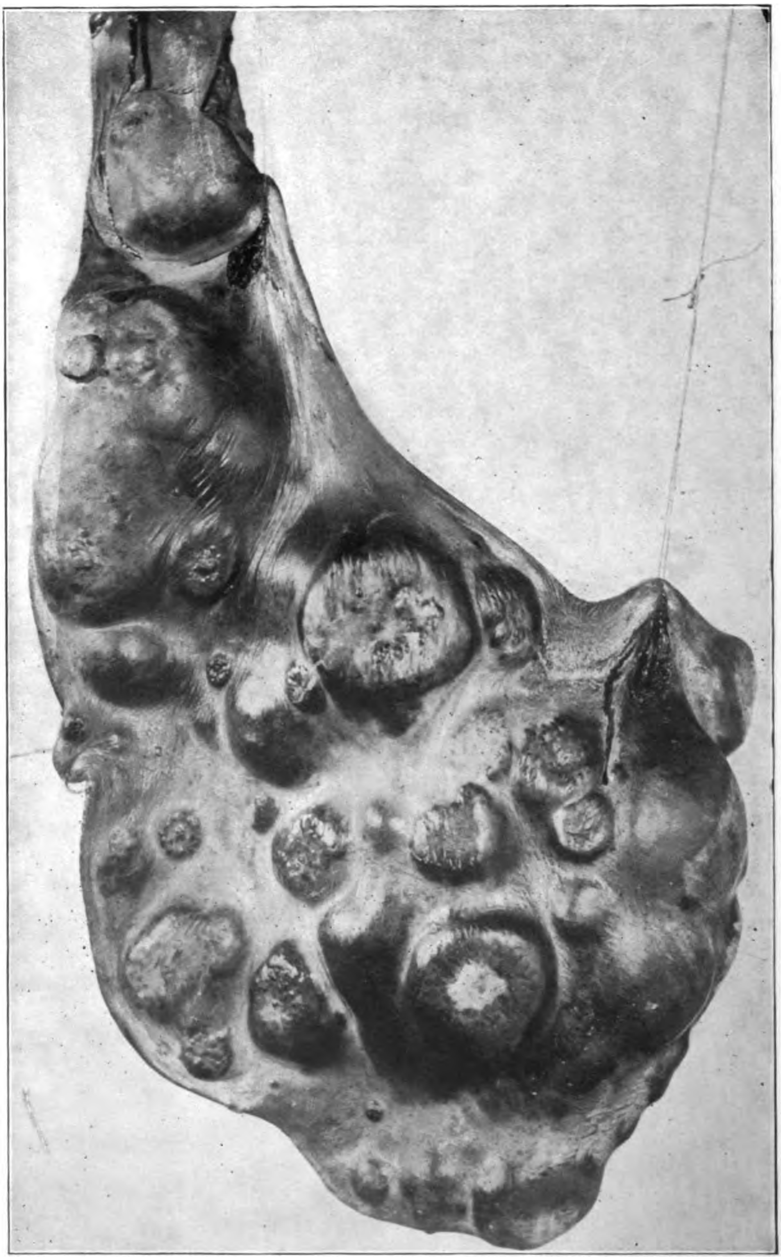
Photograph showing melanotic tumor superior to anus.

XXVII



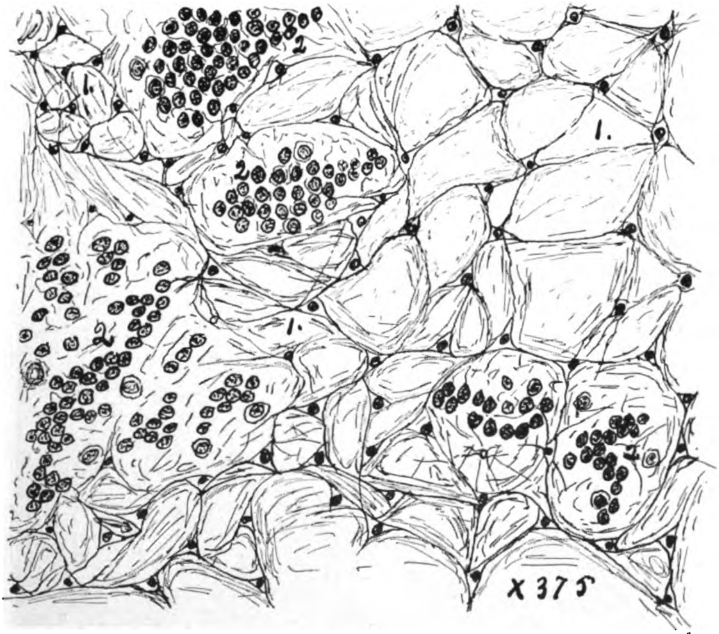
Section of melano sarcoma of a horse's liver, showing the deposit of melanin in the tumor cells.

XXVIII



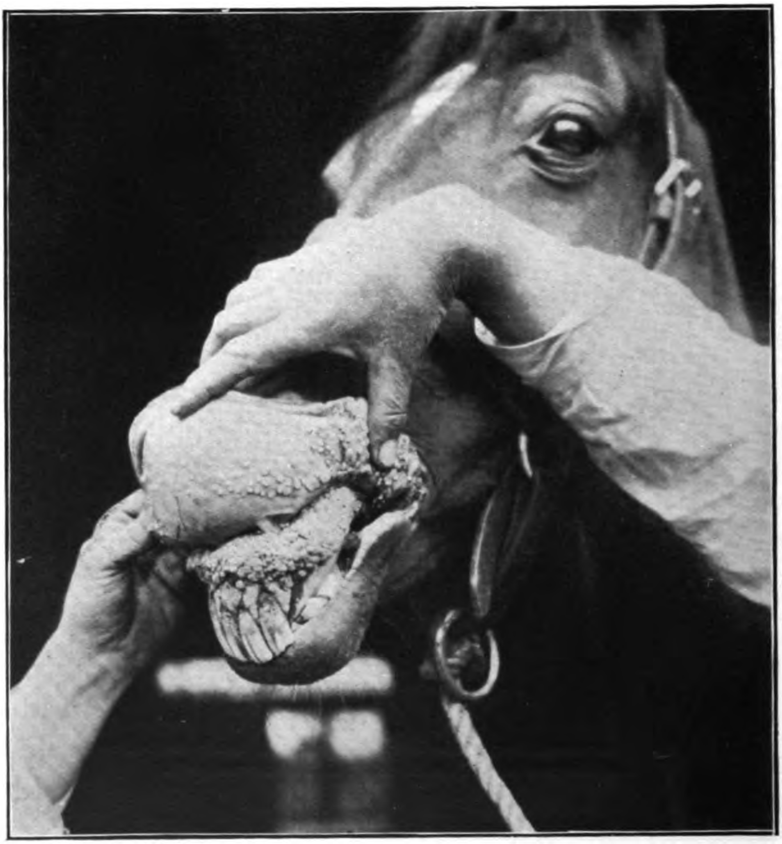
Photograph of spleen showing melano sacromata.

XXIX



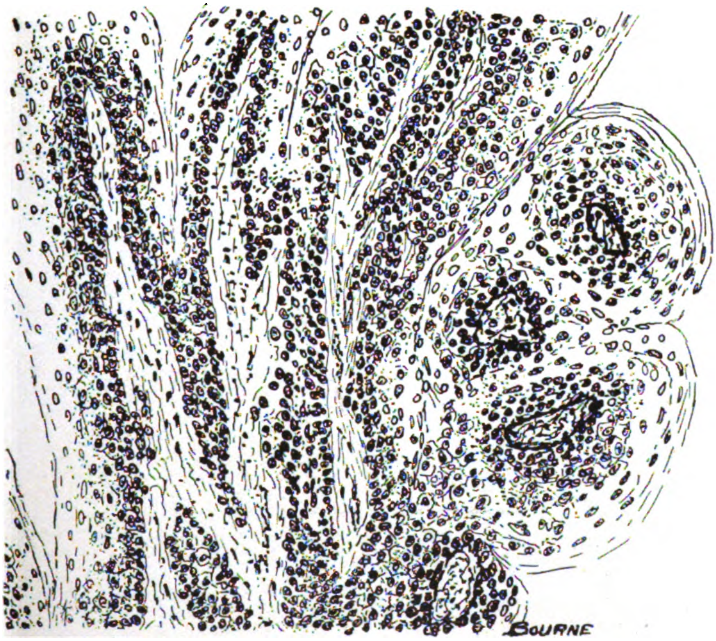
Section of a myxo-sarcoma, from a cow's liver, showing: 1, spaces formed by the union of the processes of the stellate cells; 2, sarcoma cells.

XXX



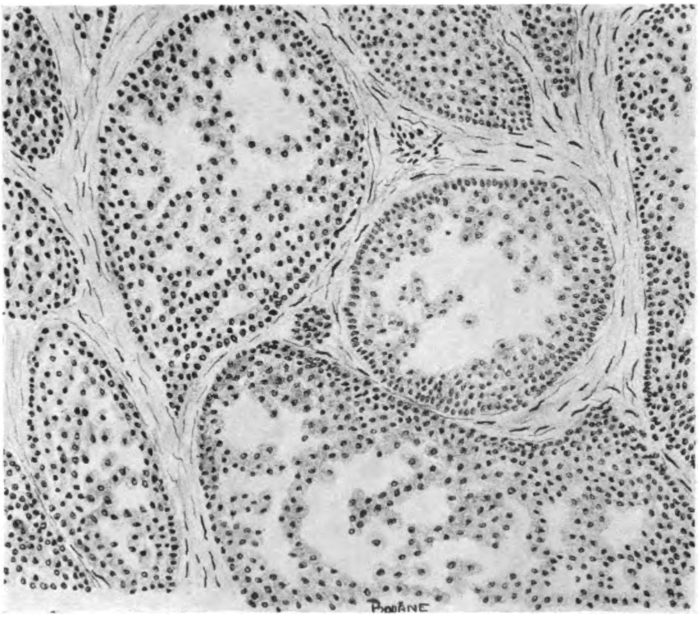
|From photograph showing papillomatosis of mucous membrane of lips of a horse.

XXXI



Section of papilloma from œsophagus of cow, showing bands of stroma covered by epithelium.

XXXII



Section of maxillary carcinoma of a horse showing the nest of epithelial cells surrounded by a stroma.

portion to the size of the cell, while carcinoma cells are embryonic epithelial cells and contain a relatively small necleus in proportion to the size of the cell.

These tumors grow slowly. They are usually encapsulated and have no tendency to form metastases. They are very mildly malignant.

Endothelioma.—This is a tumor that is not specifically a sarcoma, but it may be so classed. Endothelium has the same origin that connective tissue has—*i.e.*, the mesoderm. Embryonic endothelial cells are structurally identical to embryonic connective tissue cells. These tumors are not very common in domestic animals. An endothelioma was observed in the lung of a dog, another in the testicle of a bull. These tumors may have their origin from the endothelium lining blood or lymph channels, peritoneum, pleura, pericardium, arachnoid membrane, any organs developed from mesothelium, or any deflections from any of them. They are variable in shape, size, color and consistency.

Microscopically they are composed of cells that most frequently resemble sarcoma cells, although they may approximate the structure of carcinoma cells (Cut XXIV). The cells may be arranged in tubules, transverse or oblique sections appearing as sections of gland tubules or acini. If arranged in columns transverse or oblique sections appear as cell nests. The cells are usually cubical or spherical in shape, although they may be spindle or even squamous. The stroma varies according to the tissue invaded and may be dense fibrous or mucus. Blood-vessels are usually quite numerous, and if the endothelium is derived from the endothelium of a vessel, the vessel may be very irregular in calibre and structure. If the cells occur in columns or nests it will be necessary to differentiate them from carcinoma. This differentiation involves the comparison of cells derived from mesoderm and those derived from entoderm or ectoderm. The only essential difference, and that is not constant, is the size of the nucleus. The differentiation may also be governed to some extent by the distribution of the blood-vessels. If the cells occur in tubules, their differentiation from the adenoma will be necessary. The adenoma may be differentiated by observing the same factors that are used in differentiating endothelioma from carcinoma. Alveolar sarcoma is very difficult to differentiate from endothelioma, in fact it is sometimes impossible.

These tumors are not encapsulated and usually form metastases. They usually occur in internal organs and hence surgical relief is impossible. Fatal termination is the usual outcome.

Fibrosarcomata.—These tumors are composed of both adult and embryonic connective tissue. They are quite common, especially in the eyelids in labial commissures of horses and mules. Several cases of dense tissue growths in the withers have been investigated recently. These cases when presented appeared to be affected with chronic inflammation of the subcutum or deeper structures. Most of the above cases were clinically diagnosed as fistulous withers and an operation recommended. The operation usually consisted of dissecting away the dense masses of tissue. The cases were usually returned in from four to six weeks after the operation with larger growths than were present before the operation. The operation is frequently repeated two or three times with the same results.

These growths are found on microscopic examination to be fibrosarcomata, being composed principally of fibrous connective tissue in which there is some spindle cells and occasionally a few round cells. The presence of both fibrous and sarcomatous tissue is the principal characteristic of these tumors (Cut XXV). The number, size, and distribution of blood-vessels are very irregular.

These tumors are not distinctly encapsulated, but they do not form metastases. They are prone to recur after ablation. They may destroy life after a considerable time, as their growth is relatively slow. Operation usually stimulates them to grow more rapidly.

Melanosarcoma.—A melanosarcoma is any variety of sarcoma in which melanin is deposited in the tumor cells. These tumors are quite prevalent. Gray horses seem to have a special predisposition to them (Cut XXVI), but they are also found in bay and black horses, black or red cattle, black hogs, and in fact, all varieties of domestic animals regardless of color. On microscopic examination melanin is found deposited in the tumor cells. The melanin may be in masses or granular and occasionally it may be found outside of the cells (Cut XXVII). Excepting the deposit of melanin, these tumors have the same microscopical appearance as the round or spindle-cell sarcomata described before.

Melanotic sarcomata are frequently malignant. In an autopsy of a gray mare metastases of melanosarcoma were found in the liver, lung, spleen (Cut XXVIII), and kidney, the primary growth being located in the subcutaneous tissue on the right superior portion of the anus. Another case was observed in which there was generalized melanosarcoma in a short-horn cow.

Myxosarcoma.—This is a tumor composed of myxomatous and sarcomatous tissue. The existence of this group of tumors is doubted by some pathologists because sarcomata are prone to undergo mucoid degeneration, and if the mucoid degeneration is of limited extent and generalized throughout the entire tumor, differentiation would be practically impossible. If the mucoid degeneration affects localized areas the differentiation is not difficult. One myxosarcoma has been studied. It involved the right lobe of the liver of a cow but was not the cause of death. The tumor was about the size of a goose egg, was encapsulated, soft, and pale pink in color.

Microscopically it was composed of stellate cells, the processes of which were apparently united, thus forming alveoli (Cut XXIX). There were also round cells; some areas were composed almost entirely of round cells and other areas of stellate cells. The round cells were like the round cells found in sarcomata. The alveoli formed by the stellate cells were filled with a stringy mucus material. A few blood-vessels were observed, but they were not as numerous as in pure sarcomata.

These tumors may be malignant. When they occur upon or near available surfaces, they usually become necrotic, slough, and the tumor does not produce further trouble.

Chondrosarcoma is a tumor composed of chondromatous and sarcomatous tissue. They are not common. They usually occur in the location most favorable for chondromata. A chicken affected with a chondrosarcoma of the sternum was obtained at a butcher's stall at the city market in Kansas City recently.

Microscopically these tumors are found to be composed of a mixture of chondromatous and sarcomatous tissue in varying proportions. Sometimes the chondromatous tissue is apparently stroma for the sarcoma tissue proper. In other cases the stroma is apparently formed of sarcomatous tissue and the chondromatous tissue is the essential portion of the tumor.

These tumors may grow to an enormous size. They are not as malignant as pure sarcomata and metastatic tumors are rare. They should be differentiated from chondrofying sarcomata and sarcomata involving cartilage.

Osteosarcomata.—These tumors are composed of osseous and sarcomatous tissue. They are rather common, occurring in the horse, dog and ox.

Microscopically osteomatous and sarcomatous tissue are arranged in various proportions and in various relations, but the combining tissue in any case must be new growth tissue. Ossifying sarcomata are not osteosarcomata, neither are sarcomata of osseous tissue osteosarcomata.

These tumors are usually malignant, but they do not form metastases.

Hemangiosarcomata are tumors composed of hemangiomatous and sarcomatous tissue. These tumors are relatively common, occurring in the location common for hæmangiomata and may affect any of the domestic animals. These tumors are essentially very vascular and are highly colored.

In microscopic examination variations are observed in different hemangiosarcomata. The sarcomatous tissue in some cases appears to have had its origin from the tunica adventitia of the vessel wall; in other cases the sarcomatous tissue appears to have had its origin independent of the vessels. Again, the vessels may act as the supporting stroma for the sarcomatous tissue. The vessels may be capillary or cavernous, sinusoid or plexiform. The vessel wall may be practically normal, but more frequently it is either hypertrophied, as a result of increased number of the cellular elements or increase in the size of the cells, or the vessel wall may be thin, scale-like and atrophied. Sometimes the endothelial cells lining the vessels are cubic or columnar in shape, thus diminishing the lumen of the vessel. The sarcomatous cells may be either spindle-shaped or round.

These tumors are quite malignant, and they usually grow rapidly. The metastatic tumors are most frequently pure sarcomata.

PAPILLOMATA.

Papillomata are fibro-epithelial tumors. These are perhaps the most common of all tumors. They occur upon the surface of the skin, mucous membranes, serous membranes, and synovial membranes. They are very common upon the skin of calves, especially around the eyes, ears and poll. They occur most frequently on the lips, buccal mucous membrane, and arms of dogs. The skin of the legs and lips are the common locations of them in the horse (Cut XXX). The lumen of the œsophagus of the ox may be almost occluded by the presence of masses of papillomata. In a horse used for dissecting the cardio-pyloric junction was a continuous mass of papillomata. The mucous membrane of the bladder of the ox, sheep and hog is frequently studded with papillomata. These tumors have also been observed upon the combs and wattles of fowls. They sometimes occur in horses' feet, but are usually necrotic and do not have the appearance of papillomata.

These tumors may be hard, *i.e.*, covered over by stratified squamous epithelium that has become cornified. This variety is invariably found upon the skin and constitutes the growths ordinarily known as warts. They may also be soft. The soft variety is found upon mucous, serous or synovial membranes and the covering epithelium is not cornified. Hard papillomata or warts may appear as tabulated masses, as fungoid growths, or as a mass of villi. Any of the above forms may have a smooth surface or be fissured and have a very irregular surface. They vary in size from a millet seed to an apple. They may be single but are more frequently multiple.

Microscopically they are composed of adult epithelium and fibrous connective tissue in varying proportions. They suggest the structure of cutaneous papillæ, in fact, they have been described as hypertrophied papillæ. The fibrous tissue is the supporting structure or framework of the tumor. It contains the blood-vessels and nerves when they are present. The epithelium is the covering mantle of the fibrous tissue (Cut XXXI). In the hard papillomata the epithelium is stratified and the surface cells are cornified. In soft papillomata the epithelium may be single or stratified. The proportion of fibrous tissue and epithelium in papillomata may be the same as in normal papilla or the fibrous tissue or the epithelial tissue may be in excess so that the same papillomata are apparently sub-epithelial fibromata and others are masses of epithelial cells upon a very limited fibrous matrix. Papillomata does not have the same relation to underlying structures that normal papillæ have. The stroma of the papillomata has a definite connection with the dermis in cutaneous papillomata and the epithelium apparently originates from the lower layers of the epidermis. Transverse sections appear as centres of stroma surrounded by epithelial cells, while epitheliomata are composed of columns of cells surrounded by a stroma.

These tumors are essentially benign. They may result fatally because of mechanical interference, as in the occlusion of the œsophagus or the urethra. They may undergo necrosis, thus providing an entrance for infection and result in fatal septicemia. Papillomata do not form metastases, but they are frequently multiple. Cases have been recorded where the condition papillomatosis has been transmitted from one animal to another. By constant irritation some epithelial cells may become enlarged in the sub-surface, thus providing a centre from which an epithelioma may develop. They respond to medicinal treatment and surgical interference.

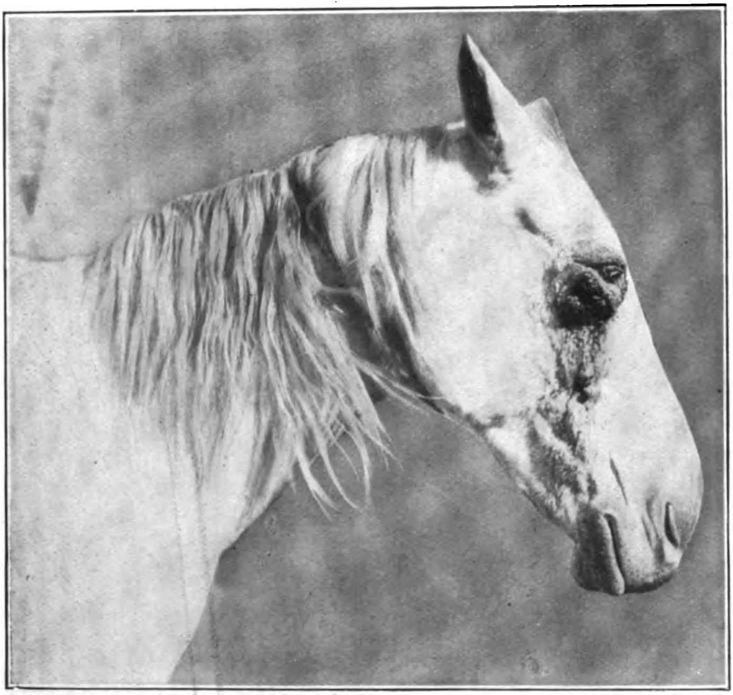
EMBRYONIC EPITHELIAL TUMORS.

This is a group of tumors composed of embryonic epithelial cells, and for description may be divided into three varieties,—(1) carcinoma, (2) epithelioma, and (3) adenoma.

Carcinomata are epithelial tumors characterized by the grouping of cells into nests or alveoli. They are of rather common occurrence but not as common as sarcomata. Horses and mules, cattle, sheep, hogs and dogs have been observed affected with carcinomata. These tumors have no selective action for any tissue. They have been found affecting mucous membranes, glandular structures, invading muscles and even in bone. They are usually diffuse, although they may be limited by a membrane resulting from reaction of the surrounding tissue. They are usually soft, encephaloid, but they may be quite hard (scirrhus), depending upon the amount of stroma or fibrous tissue contained. The color of a cut section of a carcinoma is usually gray, dirty-white, or pale pink. They may be mottled because of degenerating or necrotic centres or hemorrhage. Lobules may be observed especially in those carcinomata formed by the cellular infiltration into dense areolar tissue. Small blood-vessels may be present, but the blood supply is usually very limited and the vessels occur only in the stroma.

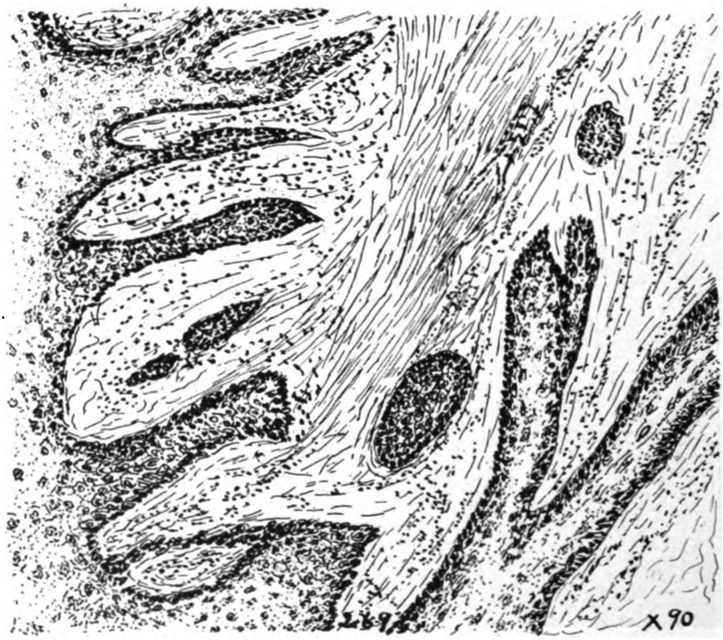
Microscopically these tumors are found to consist of embryonic epithelial cells arranged in nests, the cells having no intercellular substance between them (Cut XXXVI). The cells are variable in size and in shape, they may be squamous, spherical or columnar. The nucleus is usually much smaller in proportion to the size of the cell than the nucleus of sarcoma cells. The stroma is usually appropriated from the preëxisting tissue and therefore is variable in quantity and structure. In some cases sarcomatous tissue constitutes the stroma. The stroma forms alveoli in which the carcinoma cells occur. In fact, the alveoli are in many in-

XXXIII



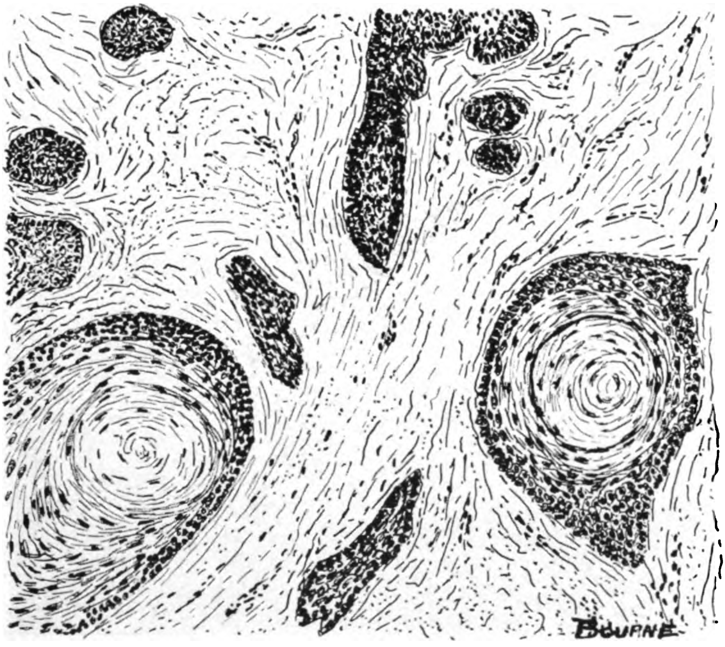
Photograph of a horse affected with an ocular epithelio sarcoma.

XXXIV



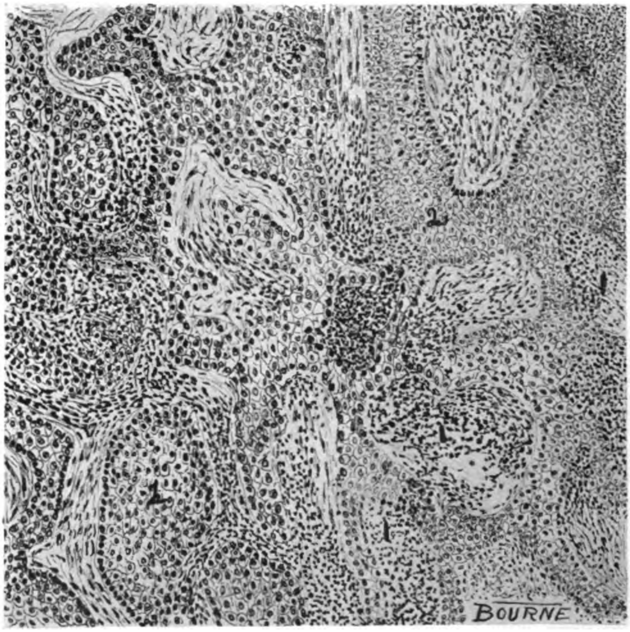
Section of an epithelioma of the hock of a horse: was the sequel of an injury. Note the ingrowth of the columns of epithelial cells.

XXXV

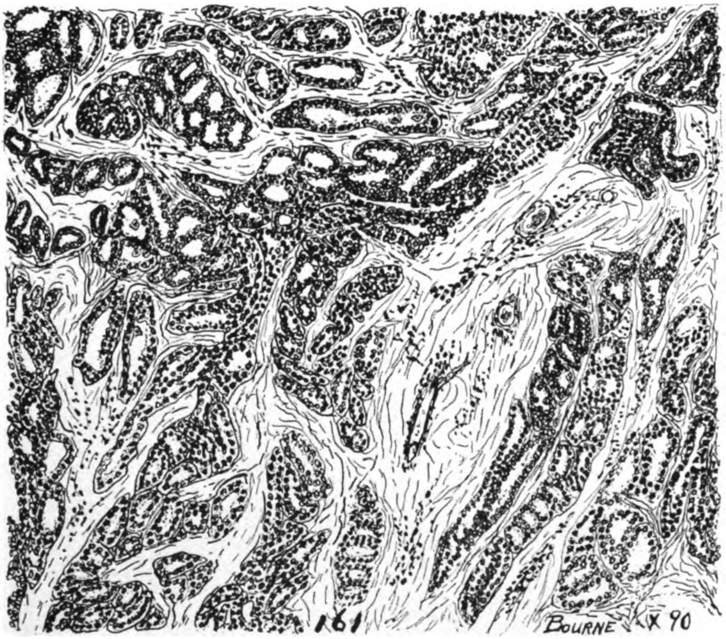


Section of a pearl cell epithelioma of the subcutum of a 14-year-old dog showing pearl cells and columns of epithelial cells.

XXXVI

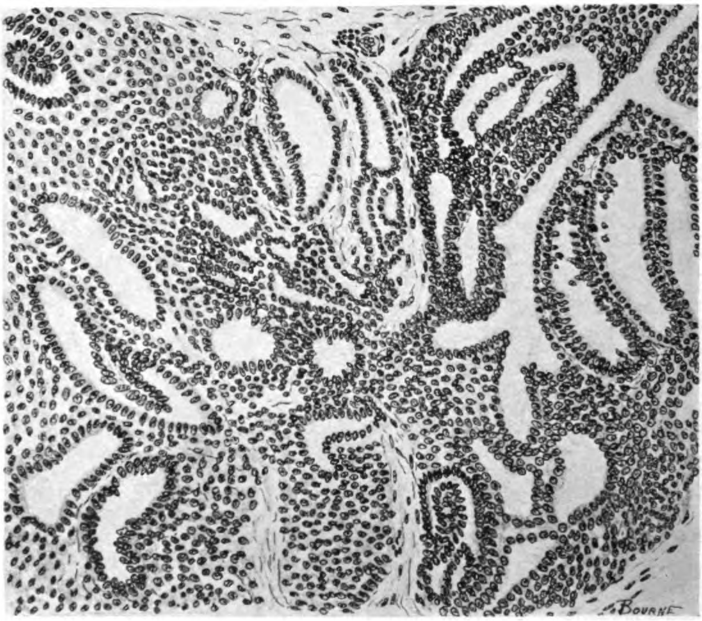


Epithelio sarcoma from eye of an ox, showing: 1, sarcomatous areas; 2, carcinomatous areas.



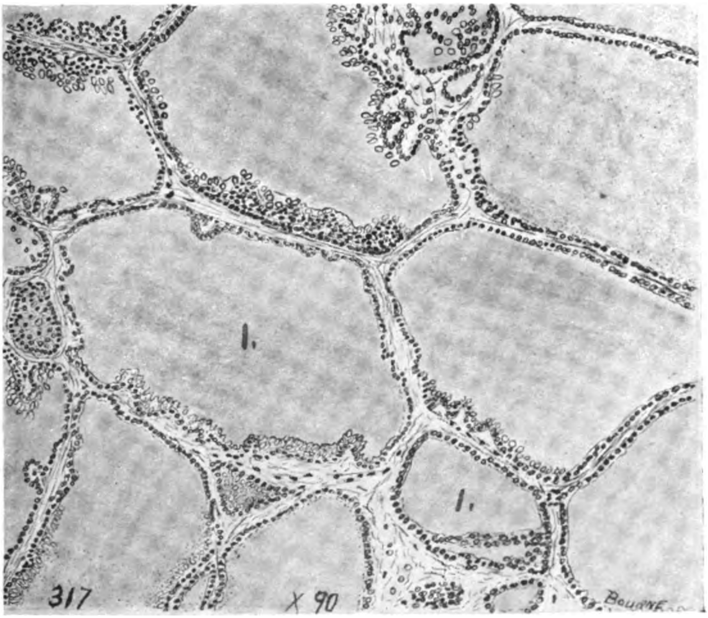
Section of an adenoma from the frontal sinus of a mule. This shows the arrangement of tumor tissue into acini and tubules.

XXXVIII



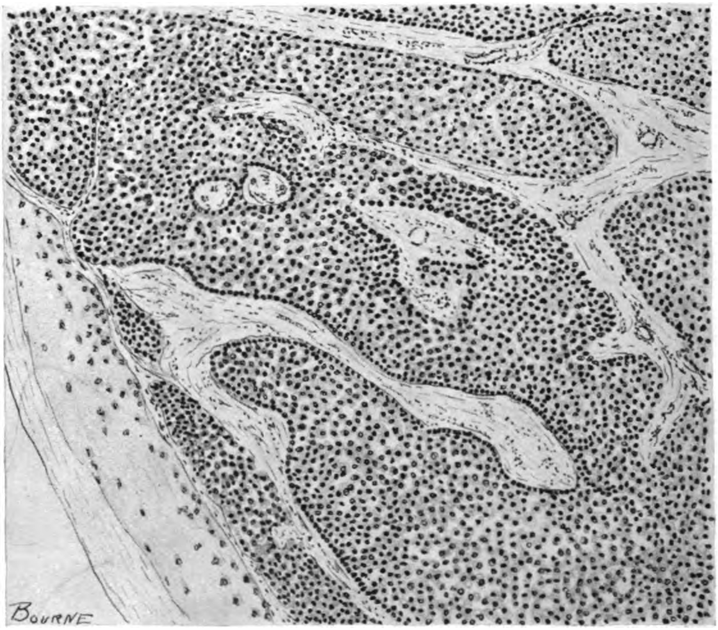
Section of sarco adenoma of the kidney of a hog, showing the sarcomatous tissue between the acini and tubules.

XXXIX



Section of a cystadenoma of the mammary gland of a sheep, showing: 1, coagulated cystic contents surrounded by an atrophied acinous wall.

XL



Section of an hypernephroma of the ovary of a cow.

stances simply dilated lymphatic spaces which have been invaded by carcinoma cells. Lymph is usually quite abundant and bathes the nests of the carcinoma cells in the alveoli. Because of the freedom of anastomosis of lymph spaces and the constant flow of lymph, carcinoma cells are easily and rapidly diffused. Karyokinetic figures are of common occurrence in rapidly growing carcinomata. There is usually an inflammatory reaction accompanied by a leucocytic infiltration in the adjacent tissue. In rapidly growing carcinomata the cells frequently completely obstruct the flow of lymph through the alveoli, resulting in degeneration or necrosis. Mucoid degeneration is perhaps more frequent than any other variety, thus producing a mucus mass.

Clinically these tumors are malign. They are not circumscribed, hence their extirpation is practically impossible. In fact, surgical interference usually stimulates them to more rapid development and in addition opens an avenue for infection. They form metastases. The metastatic tumors usually occur in the first lymphatic gland that the lymph passes through beyond the area affected with the carcinoma. Then by metastasis they will be extended on to the next group of glands and finally reach the blood stream and form carcinomatous emboli in the lungs, liver, etc.

These tumors should be differentiated from alveolar sarcoma and papilloma. The sarcoma cell has a much larger nucleus in proportion to the size of the cell and the cells are usually smaller than carcinoma cells. In cross section of a papilla from a papilloma the cells will be found arranged around the stroma instead of in nests as in carcinoma.

Carcinomata are sometimes associated with other tumors as fibroma and chondroma, but they are more frequently in combination with sarcoma. The sarcomatous tissue forms the stroma of the carcinoma. The sarcoma cells are usually of the spindle-celled variety.

Epitheliomata are epithelial tumors, the result of an ingrowth of epithelium into the underlying structures. They have been classed by some as a sub-variety of carcinoma. In this variety of tumors there is considerable evidence that they are secondary to surface injuries. A horse with a large fungoid growth beneath the left eye was sent to a Kansas City veterinarian for treatment (Cut XXXIII). The history of the case brought out the fact that the tumor was the sequel of a wire cut. Two similar cases of epitheliomata occurred in the eye of two cows after a severe attack of keratitis. These tumors are not rare and may affect any of the domestic animals. They always occur primarily in relation to epithelial surfaces. The surface is usually denuded and there is usually an acrid, fetid discharge. They may appear as elevated nodular masses or as an ulcerated surface. They are rarely encapsulated. Their consistency varies as the amount of connective tissue stroma. They are usually white or gray in color, although they may be quite variable as a result of degeneration or necrosis. The quantity of blood depends upon the vascularity of the tissue invaded.

Microscopic sections of epitheliomata are usually very similar to carcinomatous sections, indeed, it is sometimes impossible to differentiate them from carcinomata. In the beginning of the tumor formation, if sections are made perpendicular to the surface, the ingrowing epithelium will be observed as columns of cells (Cut XXXIV). These cell columns extend into the areolar lymph spaces and are then distributed or generalized the same as carcinomata. The stroma is assumed from the tissue present. The presence of the epithelial cells or their catabolic products sometimes produces a chronic inflammation of the stroma. The pressure produced from the thickened stroma upon the columns of epithelial cells may result in the formation of pearls. Epitheliomata containing the pearls are designated pearl-cell epitheliomata (Cut XXXV).

Clinically these tumors are not as malignant as carcinomata proper, and they have less tendency to form metastases. They are frequently completely destroyed by surgical interference.

Epitheliosarcomata are tumors composed of both epitheliomatous and sarcomatous tissue, the stroma being sarcomatous (Cut XXXVI). This variety is more malignant as a rule than pure epithelioma. They are rather common, frequently occurring in the eye or some of the orbital structures.

Adenomata are glandular tumors. They are structurally similar to glands but are functionless or have a perverted function. They occur more frequently in glands as the kidney, mammæ, mucous or sebaceous glands, testicle, liver, etc., but they may occur in any tissue. Swine and dogs are most frequently affected with them. They are usually circumscribed, rather firm, nodular, white or grayish-white masses. They vary in size from a pea to a man's head. In section the gross specimen usually appears lobulated, and if the tumor is large there are usually necrotic centres here and there through it. The blood supply is limited, the vessels usually being obstructed by the pressure of the new-formed adenomatous tissue.

In microscropic sections glandular cells are found in various arrangements as tubules, acini, etc. The mimicry is not complete and there is usually little difficulty in differentiating adenomata from normal gland tissue. The cells vary in shape from short cubical to tall columnar. They are usually arranged in a single layer, although the tubules or acini may be entirely filled with cells arranged layer upon layer (Cut XXXVII). The type of cells adheres to the description given in discussing carcinoma.

The stroma is usually composed of fibrous connective tissue and is variable in amount. Blood-vessels are found within the stroma. The cells lining the acini may be active and the secretion is frequently retained, thus resulting in a cyst-adenoma. The accumulated secretion may cause degeneration of the stroma, and the acini rupturing one into another produce a large cyst.

Clinically these tumors as a class are malignant, but do not produce fatal results as rapidly as carcinomata. Many individual adenomata are benign. A horse's tail was recently amputated that had been affected with an adenoma of the sebaceous glands for three years. A bitch affected with an adenoma of the mammary gland has been under observation for two years and is normal except for the presence of the tumor. These tumors rarely recur when removed, but from experience the mammary adenomata of the bitch usually results fatally immediately after operation. (The operation appears to produce sufficient shock to destroy life.) Adenomata are extended by means of the lymph. Various mixtures of adenomata are common.

Sarcoadenoma is frequently found in the kidney of the hog. They are tumors composed of sarcomatous and adenomatous tissue (Cut XXXVIII). They occur as nodular white tumor masses and may completely destroy the kidney substance. Specimens have been obtained that weighed two kilograms. Central necrosis is quite prone in them.

Cystadenoma is also common, especially in those adenomata that produce secretion. They are found in the adenomata of the mammary gland and sebaceous glands (Cut XXIX).

Hypernephromata are tumors that may be classed either with sarcoma or carcinoma. They are tumors composed of tissue similar to adrenal tissue. They occur most frequently in the kidney, ovary, or adrenal body itself. They are not diagnosed ante-mortem as such in domestic animals. They are variable in size, frequently weighing five kilograms. They are usually gray in color and invariably contain hemorrhagic areas; thus they appear mottled. They are usually encapsulated. Blood-vessels are numerous, especially in the stroma. Degeneration and necrosis is of common occurrence.

Microscopically these tumors are found to be made up of large cells similar to epithelial cells arranged in rows or columns, the columns being separated from each other by a small amount of stroma. The columns of cells may be quite variable in their diameter, appearing at times as long, slender columns and again as rather long nests of cells. The stroma is composed of fibrous connective tissue and contains many blood-vessels (Cut XL).

Clinically these tumors are very malignant, and although they appear to be encapsulated, they form metastases through the blood. They usually result fatally in the human, even after operation, probably because of the liberation of considerable of the adrenalin substance which increases blood pressure to such an extent that there is heart failure.

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FUTURE WORK IN ERADICATING TUBERCULOSIS.

BY A. D. MELVIN,
Chief of Bureau of Animal Industry, Washington, D. C.

So much has been written upon the subject of the eradication of tuberculosis for so many years that it may seem superfluous to say anything further before this body; but the fact remains that, although much has been said and much work has been done, this disease is, without doubt, upon the increase.

The great agitation which has been going on for some time regarding meat and milk inspection has brought this question of tuberculosis before the public in a more direct manner than ever before, and it occupies an important position in the minds of all reasoning people. Never, therefore, has the time seemed so favorable for securing the endorsement of the people in carrying on the work of eradication. In an important movement of this sort it is imperative that it be sustained by the endorsement of the public, for without such endorsement those who are selfishly interested generally place so many obstacles in the way as to frustrate any effort in that direction. Without becoming alarmists to an unnecessary degree, it is the duty of the profession to keep this matter before the public in such a way that the public may become familiar with the subject, and understand the importance of eradication from both an economic and health standpoint.

The reports of the Bureau of Animal Industry indicate that this disease is steadily increasing, as shown by the number of animals found affected at the various slaughtering centres. The increase in the number of cases found is due in part to the increased efficiency of the method of inspection, but only in part. For the fiscal year ending June 30, 1903, the percentage of tuberculosis found in cattle at abattoirs was 0.169; in 1904, 0.203; in 1905, 0.226; in 1906, 0.259, and in 1907, 0.363; for the months of January, February and March, 1907, the percentage was 0.434, and for the months of April, May, June, 1907, the percentage was 0.539. Thus, during a period of five years the increase in cases found upon post-mortem examination has been from 0.169 to 0.539, which surely is an alarming state of affairs. The various recent articles showing the ease with which this disease can apparently be conveyed from cattle to man has awakened the interest of the medical profession, and it is now ready to support any movement looking to the eradication of the disease. The very general impression throughout the medical profession until recent years, that this disease was conveyed principally through the medium of dust and by inhalation, failed to interest that profession in any movement looking toward the eradication of tuberculosis from live stock.

Without considering the matter as a public health question, but looking at it entirely from an economic standpoint and as a business proposition, live-stock raisers cannot afford to have this disease in their herds. As an illustration, Argentina requires that all cattle imported into that country be subjected to the tuberculin test upon arrival, and as a consequence exporters from the United States had the test made of all cattle intended for shipment. The results of these tests show that in some of the full-blooded herds nearly fifty per cent. of the animals reacted, and in consequence that many sales were lost.

When the practice becomes general for all buyers of breeding cattle to have the same tested before placing them in their herds, the breeder of strictly healthy cattle will then be much sought after. Already some breeders of full-blooded cattle have established or are arranging to establish such free herds.

Considerable tuberculin testing of cattle has been done in Washington, D. C., and vicinity, for the purpose of assisting the District authorities in obtaining a pure milk supply, and of obtaining for the Bureau further information regarding the extent of tuberculosis in that locality, and for other purposes. The tests conducted by the Bureau showed over eighteen per cent. of the cattle reacting. The percentage of tuberculosis in various States, shown by tests conducted by the officials of those States with Bureau tuberculin, indicate from 2.79 per cent. to 19.69 per cent. of the cows reacting, and slaughtered as being tuberculous. It should be stated, however, that in all probability the majority of these tests were made in herds where the disease was thought to exist, and that on that account the percentage may be higher than it would be if all of the cows of a certain section were tested.

In various sections where an effort has been made to secure a wholesome milk supply, many dairymen have been found ready of their own accord to assist in the work of eradication. Many others would do so, with some small financial assistance, and others would necessarily have to be forced to submit their cattle for examination. As the eradication of the disease in such cases is undertaken as a public health measure, it would seem reasonable that the States should assist in recompensing, at least in part, the dairymen whose cattle are slaughtered. Many of these dairies consist of highly-bred cattle, and it has been and will be necessary to employ the Bang method, in addition to the slaughter of the reacting animals.

The following is a form of agreement prepared by the Bureau, and required as the consideration for testing the herd:

UNITED STATES DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

AGREEMENT.

IN CONSIDERATION of the testing of my herd of dairy cattle by the Bureau of Animal Industry of the United States Department of Agriculture, and the assistance of said Bureau in enabling me to produce milk free from the contamination of disease germs, I, ... owner of.....................dairy herd, do hereby agree as follows:

1. I will cause all animals that react to the tuberculin test, and which also show other symptoms of tuberculosis, to be slaughtered within a reasonable time under United States meat inspection, and I will cause the carcasses of said animals to be disposed of according to the meat-inspection regulations of the Bureau of Animal Industry, based upon the lesions found upon inspection.

2. I will cause all animals that react to the tuberculin test, but which show no other evidence of tuberculosis, either to be slaughtered and disposed of as herein provided for animals which show also other evidence of tuberculosis, or I will cause such animals to be removed from the dairy farm upon which the healthy animals of the herd are maintained, and I will cause the diseased animals to be segregated from the healthy animals, and thereafter they shall remain so segregated.

3. In all cases where the milk from such segregated reacting animals is to be used for any purpose whatever I will cause the said milk to be sterilized.

4. I will cause the young from said segregated reacting animals to be removed from their mothers at birth, and will not permit the said young to suckle their mothers.

5. Any part of my premises contaminated by reacting animals will be submitted by me to a thorough disinfection under the direction or supervision of the Bureau of Animal Industry.

6. All cows owned by me—both healthy and tuberculous—I will mark in such manner as to enable their identity to be retained, and I will change the location of no cows except after due and timely notification to the Bureau of Animal Industry.

7. I will add no cattle to the said herd which have not passed a tuberculin test administered by an authorized agent of the Department of Health of the District of Columbia or by an agent of the Bureau of Animal Industry.

8. I will comply with all reasonable sanitary measures which are indicated by the Department of Health of the District of Columbia or by the Bureau of Animal Industry.

In Witness Whereof I have signed this agreement this............ day of............., one thousand nine hundred and seven.

....

Owner of the......Dairy Herd.

(Address).........................

....

Witness:

....

The recent effort of the large packing interests to buy all dairy cows subject to post-mortem inspection shows how serious the plague is becoming. Sooner or later the one who raises those diseased animals must suffer the loss, unless the loss is paid for out of public funds, and when he does, you may then know that the end of the disease is in sight.

As before stated, no progressive stock raiser, and in fact no stock raiser, whether progressive or not, can afford to go on breeding cattle while this disease exists in his herd. As soon as this fact is fully understood, much of the objection raised against the sale of live stock subject to inspection will disappear, for it would be worth the price of several condemned animals for the owner of a valuable herd to know as early as possible when the disease exists in his herd, as the longer he delays in taking steps to prevent its spread, the greater will be his loss eventually.

Some years ago the Bureau of Animal Industry, in order to protect, as far as possible, the breeders of cattle from the danger of this disease, issued an order requiring all cattle imported for breeding purposes to be subjected to the tuberculin test. The wisdom of this step can be shown by merely stating that 19.7 per cent. of the cattle tested since that time have reacted, and that from several foreign herds no cattle are even considered for testing on account of the general infection existing in those herds.

Unless some steps are taken soon to eradicate the disease, will not the same conditions exist in this country within a few years, if they do not already obtain in some instances?

The Bureau has recently undertaken to ascertain the origin of all tuberculous cattle slaughtered at establishments where inspection is maintained and in such instances to inform the State authorities of the facts. The information thus obtained is transmitted to the authorities of the various States, and it is hoped that it will be used in endeavoring to locate the centres where infection exists and to eradicate the disease. When a system of coöperation can be effected between the State and Federal governments, providing for a general plan of tagging all dairy cows shipped to market centres for slaughter, then the work of locating these disease centres will be greatly simplified. Had the packers been successful in their recent efforts to buy all such cattle subject to inspection, such a system of tagging would have been necessary in order that the identity of the animal would have been retained.

It may at some time be necessary for the Federal Government to quarantine against the interstate shipment of cows from certain States where the disease prevails to a considerable extent, and require a strict supervision over all animals removed from such States for interstate shipment, and only remove the quarantine from sections of a State when it has been demonstrated that the disease has been either eradicated or is under strict local quarantine.

The recent agitation against the milk of tuberculous cows as human food has had the effect of causing many herds to be examined with astonishing results to not only the owners but to the officials themselves. Can it be wondered at that so many infants and children die of intestinal tuberculosis when so many of the cows from which the milk is obtained are tuberculous?

Recent feeding experiments conducted by the Bureau have proved conclusively that hogs are readily infected through the ingestion of feces and of milk from tuberculous cows. The percentage of all cases of tuberculosis of all the hogs slaughtered under inspection for the fiscal year ending June 30, 1907, amounts to 1.43. There is no doubt in my mind that this percentage will be reduced to a negligible quantity as soon as the disease is eradicated from cattle. There has been considerable incredulity with reference to the tuberculin test, particularly among those opposed to the movement to stamp out the disease, but the statements of such persons should not be given very serious consideration except as they may be the means of prejudicing the uninformed against the tests. There is no more reliable diagnostic agent than properly prepared tuberculin in the hands of the careful observer. The reports received by the Bureau from State officials from all parts of the United States of tests made by competent veterinarians absolutely confirm this statement. Frequently affected animals give little or no reaction, or a subnormal temperature, but in these latter cases any veterinarian of average ability should be able to diagnose the disease by physical examination alone, as in nearly all such cases the disease has become so generalized that a mistake should not be possible. It is understood, of course, that tuberculin should be administered by a reliable veterinarian and that in addition to the test, a physical examination should be made of the cattle. A compilation of these many tests is now being made with a view to publishing the report.

That impotent commercial tuberculin has been on the market is a fact which was demonstrated by the Bureau, and at its request Congress gave to it authority to make tests of tuberculin, vaccines, and similar products, and to publish results. Such tests are now being made, and if any inferior agents are found, public notice of that fact will be given. The use of this worthless tuberculin may to some degree have been the means of prejudicing some practitioners and others against the use of any tuberculin.

In my opinion the time is very near at hand when our profession will be face to face with the problem of eradicating this plague from the herds of the country. It therefore stands us all in hand to give the subject our most careful thought and consideration. It means the expenditure of millions of dollars of public money and a great financial loss to individuals. I again repeat, that in a movement of this magnitude it is necessary to have the support of the public and of the live-stock owners in general, in order to meet with success; and the principal object of this paper is to place before you the importance of informing stock owners and others of the great dangers from tuberculosis both from an economic and health point of view.

TUBERCULOSIS OF HOGS, WITH SPECIAL REFERENCE TO ITS SUPPRESSION.

By JOHN R. MOHLER AND HENRY J. WASHBURN.

INTRODUCTION.

Tuberculosis in the human family has been lessening materially during the past fifteen years, but reports from the various meat-packing centres of the country fail to show the same encouraging condition regarding tuberculosis in hogs during the same space of time. It must be admitted that several localities have recently reported a decrease in the number of tuberculous swine sent from their farms during the past four years, but a review of the collective records of the country at large shows an increase rather than a decrease in the number of affected individuals among our pork-producing animals. Indeed, there is probably no disease of hogs, not even excepting hog cholera, which is causing heavier losses to the hog raiser than tuberculosis, and it is also the cause of the greatest loss to the packers, and of the most anxiety to the veterinary inspector of meats. This disease until recent years has been looked upon as of an uncommon occurrence, and only of importance from a meat inspection standpoint, but to-day it must be considered as a general veterinary problem, easy of solution, and which should receive the careful attention of all sanitarians. The swine of this country January 1, 1906, numbered 52,102,847 and their value at that time was $321,802,511. From these figures one may partially realize the serious menace to the hog-raising industry which is offered by a disease which affects almost 1.5 per cent. of all hogs slaughtered at the abattoirs of this country which have Federal inspection. Reports from European abattoirs show that tuberculosis is far more widely spread among their hogs than among ours, some of the returns showing as high as 5.5 to 7.5 per cent. It is to be hoped that the spread of the disease in this country may be checked, and that concerted action by the stock owners and veterinarians may lead to the complete eradication of this costly affection. The small amount of money required to begin hog raising and the quick returns on the capital invested make this industry an attractive one to the small farmer in nearly all districts. The hog will make a pound of gain on less food than most live stock, and will profitably utilize waste food-products of every variety if properly prepared for him. As tuberculosis in this species is chiefly acquired by ingestion, the significance of the latter statement is obvious. Tuberculosis of hogs is closely associated with the same malady in cattle. The reason for this is apparent when one considers the close relations of these two species of domestic animals upon nearly every farm. The Bureau of Animal Industry is at present endeavoring to locate the infected farms, or at least the infected localities, and to ascertain the direct cause of its spread in these districts. Owing to the number of hands through which hogs go before reaching the abattoirs this is not an easy proposition, but it can, and is being accomplished. Already through coöperation with the state authorities a large number of infected farms have been definitely located, the conditions on the farms have been investigated, the source of the disease determined, and methods for its suppression recommended. In Wisconsin the Bureau and state officials have been working with these ends in view. When hogs have been found tubercular and the farm from which they came located, the State Veterinarian has been notified, who is empowered by law to quarantine the premises of any farm when he suspects the presence of a contagious disease. He then applies the tuberculin test to the cattle on the farm, and otherwise looks for the source of infection. This frequently results in finding the cattle tuberculous. Similar coöperation has recently been taken up with Nebraska, Iowa and Minnesota, and the results are equally encouraging. This coöperation with the State is of great value and the results would be of greater magnitude if state legislation could be secured, compelling the tagging of all hogs going to slaughter, whereby these animals if found tuberculous could be immediately traced to their point of origin, and the source of infection removed. It is evident that the suppression of hog tuberculosis would save the country millions of dollars annually, and when it is realized that there are vast numbers of tuberculous hogs killed in abattoirs having no inspection of any kind, it can be seen that the danger to human life from this source would at the same time be removed.

PREVALENCE.

As previously stated, tuberculosis of hogs is on the increase in certain States, while in others it is decreasing. As an example of the latter may be mentioned Wisconsin, in which the gradual decline of the disease may be attributed to:

(1) The state authorities have been making efforts toward requiring the pasteurization of all skimmed milk which is returned to farmers from the creameries.
(2) The hand separator is being more generally installed, which confines the disease to the single farm whose cows have been attacked.
(3) The earlier age at which Wisconsin hogs are marketed.
(4) The state officials have been doing good work in condemning tuberculous cattle in dairy herds, thus removing from the hogs their greatest source of infection.

The prevalence of this disease among swine must be judged from abattoir statistics entirely. Thus it has been noted from the records kept by the Bureau of Animal Industry that some sections of the country contribute a far greater proportion of diseased animals than others. Hogs from Arkansas, Oklahoma, Indian Territory and Texas are remarkably free from this disease, due probably to the method of caring for them, or rather the lack of caring for them. They are not hampered in feed lots as in certain sections where most of the disease is found, but are allowed to roam over large areas of pasture and to shift for themselves. When they are found affected the majority of them show very slight lesions. No prolonged feeding is practiced in narrow bounds as in the corn belt. Moreover, there are relatively few dairies in these sections and likewise few tuberculous cattle. On the other hand, the pigs are carried from birth to maturity on some form of pasture, as alfalfa, oats, corn, cowpeas, sorghum, rape and peanuts, all the year round. The pigs of the forest region of Hungary which are pasture-fed are likewise rarely tuberculous according to Hertwig, and there can be no doubt that swine fed on entirely vegetable food, as corn and roughage, are proportionately less affected than those fed on dairy products or behind diseased cattle.

A great many hogs in Texas are raised on alfalfa supplemented with corn, and the result is clearly shown in the Bureau statistics which indicate that from January 1st to June 30th of this year only one-tenth of one per cent. of over 325,000 hogs slaughtered at Fort Worth showed tuberculous lesions, while only 51 or .015 per cent. were condemned as unfit for food. In striking contrast to this may be given the statistics for the same period of three cities in one of the leading dairy States, which show 3.1 per cent., 3.4 per cent., and 6.4 per cent. respectively, of the hogs slaughtered to be affected with tuberculosis. There are a large number of coöperative creameries in the territory contiguous to these three cities and the raw skimmed milk is taken home by the patrons for their hogs. Samples of separator slime from the two creameries in the town showing the largest number of tuberculous hogs were injected into guinea pigs, and in one instance virulent tubercle bacilli were recovered.

The hog buyers for packing houses are gradually becoming familiar with these conditions from bitter experience and are avoiding certain sections of certain States; and there are at least two eastern packers who will not under any conditions kill hogs from one of the badly infected States. In other localities the packers are beginning to take self-protective measures to have the feeder of diseased hogs bear the burden, and many of the smaller establishments in the central West are buying hogs subject to post-mortem inspection. This attack on the farmer's purse will probably have more beneficial results in making him fully alive to the seriousness of the situation than any other procedure.

During the first six months of this year there were over 18,000,000 hogs slaughtered under Federal inspection, of which about 1.5 per cent. were tuberculous. Of these tuberculous carcasses 74 per cent. were passed for food after tanking the diseased parts, 12½ per cent. were placed in the lard tank after trimming out and tanking the tuberculous parts, and 13½ per cent. were condemned for offal.

In an endeavor to trace out the origin of the infection of tubercular hogs that were arriving at one of the packing plants of Iowa, Rogers of the Bureau of Animal Industry, for some time carried on an experiment which consisted of tagging the hogs that were hauled to market at that place in wagons, before they were removed from the individual farmers' wagons, and later using these tags as means of identification in case tuberculosis was found to exist in any of them at the time of slaughter. In this manner 3,420 hogs were tagged, and on tracing them up to their final disposition it was learned that less than 6 per cent. of the farms were shipping all of the tuberculous live stock to that market, while more than 94 per cent. of the farms were free from the disease. This proportion of non-infected farms should give great encouragement to any efforts that may be made to eradicate the disease from the State. It was further noted that the successive shipments of hogs marketed by certain farmers always contained tuberculous animals, and in at least two instances, the entire consignments were condemned for tuberculosis at the time of slaughter.

PATHS OF ENTRANCE OF TUBERCLE BACILLI.

As a result of numerous experiments conducted on hogs, it has been quite conclusively shown that hog tuberculosis is an ingested disease, and that the tubercle bacilli are absorbed almost at the beginning of the alimentary canal. The tonsils of pigs have been examined by several investigators including ourselves, and tubercle bacilli have been found in the apparently normal tonsillar crypts. From the tonsils to the submaxillary glands is but a very short distance, and on a direct line with the lymph current in the lymphatic vessels. This fact taken into consideration with the infection of the submaxillary glands in over 93 per cent. of all tuberculous hogs shows that the tonsils play a very important part as the portals of entry of the tubercle bacillus. Again, hogs may be called scavengers, as they eat various substances, rough or smooth, hard or soft, sharp or blunt; and wood, nails, wire, etc., may be taken into the mouth with other food in such a way as to cause sufficient abrasion of the mucous membrane to permit the entrance of the bacillus, and its absorption by the lymph vessels and subsequent deposit in the submaxillary gland, follow. Young pigs at the time of teething are particularly likely to become infected owing to the abrasions of the mucous membrane resulting from the new teeth. Catarrhal conditions of the buccal mucous membranes, such as is observed in stomatitis, also lower the vitality of the epithelial cells, allowing the entrance of tubercle bacilli. In a few cases the only lesions observed were in the mesenteric glands, which would indicate that the ingested bacilli had safely passed the usual portal of entrance, and had been taken up by the lacteals of the intestinal tract and filtered out in the mesenteric lymph glands. Thus Ryder, in charge of the Boston Station, has made a careful post-mortem examination of 59,460 hogs, of which number 50 carcasses showed lesions of the mesenteric glands only. Of far more frequent occurrence are the lesions of the gastro-hepatic glands, and of the bronchial glands. In fact, our study of the lesions of hog tuberculosis shows that next in the order of frequency to the submaxillary gland infection come the combination of the submaxillary with the bronchial glands, then the submaxillary, bronchial and gastro-hepatic glands, next the submaxillary, bronchial, gastro-hepatic glands and the liver. In a certain small number of cases infection probably occurs directly through the respiratory tract, but these instances are extremely rare. Even more infrequent are those cases of tuberculosis which arise as a result of traumatism, especially the infection of castration wounds by the use of infected instruments or otherwise. One boar has come under our observation, whose testicles and mucous membrane of the penis were so markedly tuberculous that the genital tract of the sows covered by him could scarcely have escaped infection.

METHODS OF INFECTION.

The most frequent infection of hogs with tuberculosis occurs no doubt through the digestive tract, and in this infection tuberculosis of cattle is very intimately concerned. In those instances in which a marked increase in the number of tuberculous hogs from a certain locality has been noticed and investigated, it has too frequently been found that the hogs in question had been fed upon the by-products of a cream separator or that the carcass of some animal succumbing to tuberculosis had been thrown to the hogs for final disposal.

The certainty with which either of the two conditions mentioned above will lead to the infection of the hogs has not heretofore been appreciated in many quarters. Another source of infection for swine has been shown to exist in the practice of allowing a lot of hogs to run behind a herd of tuberculous cattle, where the tubercle bacilli excreted with the feces by a tuberculous bovine may readily infect the hogs. Infection of a litter of pigs by a tuberculous sow presents another source of danger. Other methods of infection which may be mentioned and which will be considered separately below consist in the feeding of infected offal from slaughter houses, infected kitchen slops, and in the exposure to sputa of tubercular attendants, to tuberculosis of fowls, and to infection through castration wounds. These sources of tuberculosis, however, should be considered of minor importance and must not detract attention from the leading factors in the production of the vast majority of cases of hog tuberculosis which are unquestionably the milk and feces of tuberculous cattle. Control these and tuberculosis of swine will at once be greatly reduced.

HOGS AFFECTED BY MILK OF TUBERCULOUS COWS.

Numerous experiments have been conducted by various scientists in many countries which show a great unanimity relative to the ease with which hogs may contract tuberculosis from being fed on milk of tuberculous cows. Thus Gerlach, Zurn, Bollinger, Wesener, Bang, Peuch, Ernst, Pearson, Hills, and Rich, and others, have shown that pigs so fed have become tuberculous in as high as 100 per cent. of the hogs fed. Furthermore, the experiments of the Bureau of Animal Industry have shown similar results. When hogs were fed on tuberculous milk for only three days the post-mortem examination held one hundred and seven days later showed that 83.3 per cent. of the hogs had become tuberculous. When hogs received tuberculous milk for thirty days and were allowed to live fifty days later, 100 per cent. of the animals had developed generalized tuberculosis. That similar experiences occur under natural conditions on the farm has been proved by tracing certain shipments of tuberculous herds to the farm where they were raised and fattened. In one instance, a shipment of seventy-four hogs showed tuberculosis in sixty-one, and investigation brought out the fact that the swine had been fed on the skimmed milk of a creamery in a nearby town. The separator slime from two of the creameries in this town was obtained for experimental purposes, and the inoculation test showed that one of these samples produced tuberculosis in all the guinea pigs inoculated. It is also of interest to know that the hogs slaughtered by the abattoir in this same town for the six months ending June 30, 1907, were tuberculous in 6.4 per cent. of the cases, and in March showed the large percentage of 6.69 per cent.

At the present day centrifugal separators have come into general use in most creameries, and upon many dairy farms, for the removal of the cream from the remaining portions of the milk. During this process the rapid revolutions of the shaft and discs of the machine throws down at the base of the shaft a deposit consisting of dirt, hair, manure, and other impurities which may have found their way into the milk, and mingling with this mass, bacteria may also be found in great numbers.

The charge has been repeatedly made that tubercle bacilli are scattered by means of the common practice of distributing the separated milk, or the separator refuse, among the farmers who constitute the patrons of the creamery. Such charges as this should not be made unless some evidence can be presented in substantiation; therefore careful search has been made of samples of the separator sediment from a number of creameries located in widely removed dairy regions to see if they really harbored virulent tubercle bacilli.

When first received at the laboratory this material is examined microscopically. Following this examination all samples, whether showing the presence of suspicious bacteria in stained preparations or not, are injected into guinea pigs where the presence of living tubercle bacilli is soon made manifest by the development of tubercular lesions. As a result of this examination of the products from fifteen creameries, it has been definitely shown that 5 or 33⅓ per cent. of the samples examined contained virulent tubercle bacilli.

While there are many creameries which are managed on a mutual benefit system by the dairymen of the region in which they are located, to which no milk containing tubercle bacilli is delivered, and from which the separated milk when divided among the creamery patrons is free from tubercle bacilli, and consequently furnishes a safe and valuable article of food for the calves and pigs to which it is fed, there are unfortunately others, as above indicated, which receives milk daily from one or more cows so affected with tuberculosis that they excrete tubercle bacilli, and these find their way in large numbers into the cans of separated milk which are returned to the farmers from these creameries.

In this way a single cow with a tuberculous udder may spread the disease to numbers of hogs, and may also infect many farms in a large section of country that have never been contaminated before with this destructive disease. While this particular means of disseminating tuberculosis could be absolutely prevented by sterilizing the milk, this simple precaution is in the majority of cases not taken.

In one State where hand separators are quite frequently used on the farm, a bunch of tuberculous hogs which contained 36 per cent. of tuberculous animals, was traced to the farm of the raiser, and the State authorities were notified, who made a tuberculin test of the cattle producing the milk, with the result that about 22 per cent. of them reacted. It will thus be seen that creameries are not alone incriminated but the skimmed milk from the hand separator, if it comes from a tuberculous herd, is equally dangerous, and the buttermilk produced at the creamery from the infected separated cream is likewise capable of carrying tubercle bacilli and infecting the animals which consume it. The one great advantage from a hygienic standpoint, which the hand separator has over the public creamery is that the milk from an infected herd is usually fed to the one bunch of hogs, while the skimmed milk from the creamery is generally all mixed together in a vat and each farmer takes back with him his pro rata of skimmed milk which is most likely to be produced by several herds of other people's cattle. Hence the skimmed milk of but one tuberculous herd is liable as a result of this practice, to contaminate the entire product of the vat into which it is placed. For this reason it behooves hog raisers to see that their skimmed milk has been properly heated before they feed it and the state authorities to make such heating by creameries compulsory as a simple and easy way of greatly reducing hog tuberculosis.

INFECTION BY FECES OF CATTLE AND HOGS.

A very prolific source of infection of hogs with tubercle bacilli and one which closely rivals tuberculous refuse from public creameries is to be found in the feces of tuberculous cattle. It is a very common practice to allow hogs to accompany cattle about the feed lot, and while doing this they thoroughly work over the feces, thus saving whatever portions of food have passed undigested through the alimentary tract of the bovine. In herds that are healthy this manner of feeding is to be commended because of the economy, but wherever there are tuberculous animals among the cattle the danger of passing the infection on to the hogs by means of the feces becomes very great.

In a series of investigations which were carried on by the

Bureau it was found that the feces of tuberculous cattle are often loaded with tubercle bacilli. To test their virulence, tuberculin-tested hogs were placed in isolated pens where a few shovelfuls of such fæces were thrown daily while the hogs were fed upon other food which was free from tubercle bacilli. The result was the infection of 25 per cent. of the first lot of hogs, and 100 per cent. of the second lot that were exposed. The tuberculous condition of the cattle was only shown by the tuberculin test, as they were apparently healthy, having no cough, or any visible indications of disease. A somewhat similar experiment was performed by exposing tuberculin-tested hogs solely to the feces of healthy cattle that were swallowing small quantities of tubercle culture in their drinking water. The exposure lasted eighty-one days, with the result that 75 per cent. of the first lot, and 100 per cent. of the second lot of hogs contracted tuberculosis. In a recent examination, at the Bureau Experiment Station, of the manure passed by twelve cows just purchased from dairy farms in the District of Columbia, and affected with tuberculosis to an extent only demonstrable by the tuberculin test, tubercle bacilli were found by Schroeder in over 41 per cent. of the cases, both by microscopic examination and by guinea pig inoculation. The result of this test led to the suggestion that tuberculous hogs might equally well serve as distributors of tubercle bacilli by means of their feces, and an experiment is now being carried out, in which a litter of healthy pigs is being exposed to possible infection by being brought in contact with the feces of hogs that are known to be affected with lesions of tuberculosis. All other possible sources of infection have been excluded and development of tuberculosis by any of the pigs will point positively to the feces as the carrier of the tubercular infection.

Only recently a probable instance of infection of hogs by cattle feces came under observation. Of thirty-four hogs which were marketed by Mr. H., twenty-three were found diseased, and upon investigation it was ascertained that the owner had a herd of dairy cows, the stable manure from which was thrown into the hog yard. The hogs were given no milk, nor were they permitted to mingle with the cattle, but were pastured and fed on corn and what they could gather from the cow manure. In fact, the latter form of exposure was the only plausible explanation of infection, and this was later accepted when the tuberculin test of the herd revealed nineteen out of twenty-seven cows diseased, which test was confirmed when the cattle were slaughtered and found to be tuberculous, some in an advanced stage.

HOGS FED ON TUBERCULOUS CARCASSES OR SLAUGHTER-HOUSE OFFAL.

It is an all too prevalent custom in some sections for hog raisers to buy up all carcasses of animals that have died from various unknown causes and feed them to their hogs. This is a fertile source of infection with parasites and with whatever infectious disease the animal may perchance have died. Several instances of tuberculous hogs being traced to such an exposure have been found. Probably the most important case occurred in the eastern station where thirty-one out of forty hogs were condemned for tuberculosis. When these animals were traced back to the raiser it was found that he was running a large dairy and that a dairy inspector had by clinical examination condemned one of his cows for advanced tuberculosis. The owner in order to save something, as he stated, from the carcass, hauled it out to the hog pasture and allowed them to consume it with the above disastrous results. Previous hogs that had been raised by him had never been condemned, and the bunch in question were running on a large pasture separated from cattle and apparently had no other opportunity to become infected than by the condemned tuberculous dairy cow.

An equally dangerous source of infection is likewise observed in the methods which obtain among some of the small country slaughter houses. It is not unusual for these houses to get rid of their blood, intestines, viscera and other inedible parts by feeding them to hogs, a herd of which is usually kept on the premises. This custom is pregnant with danger and is another fertile source for perpetuating the infectious principle of various infectious and parasitic diseases, and particularly a dietetic disease like tuberculosis. The feeding of offal, etc., to hogs on the premises of abattoirs having Government inspection is not permitted by the Federal Meat Inspection Regulations, and other state and municipal regulations should be equally stringent on this feature, as has been done in the meat regulations of the City of Philadelphia. We have no records of such hogs being tuberculous as they are killed by the butcher on the premises on which they are fed. As these houses have no inspection the carcasses are marketed as healthy.

INFECTION FROM DISEASED BROOD SOWS.

A case of this character was thoroughly investigated by Clancy, of the Bureau of Animal Industry, which is full of instructive features.

It had been noticed that a certain shipper of hogs to the East St. Louis market occasionally sent in a load containing many tuberculous animals, and close inquiry and consultation of shipping records showed that these loads were mainly composed of hogs from one and the same farm. An inspector was consequently detailed to visit this place and to uncover if possible the source of such wholesale infection. In his report to Washington he writes:

"But four cows are milked and no part of their milk is fed to pigs. The brood sows are kept in several widely separated lots on different parts of the farm, and they are moved about frequently.

"A physical examination, it would seem, is of minor importance when we consider the evidence which points conclusively to the fact that several of the brood sows must surely be tuberculous." He next states that twenty-eight hogs were shipped from this farm in May, 1902. In July, 1904, eleven affected hogs left the farm, and in September of the same year fourteen others followed, and were condemned by Federal inspection at the abattoirs. In 1905, twenty-seven tuberculous swine were shipped from this farm, making a total of eighty animals which had contracted tuberculosis on this farm within a period of four years. It was further shown that a year or two previous to the first appearance of tuberculosis among the hogs of this farm the owner had purchased some imported cattle from a neighbor who was engaged in importing cattle from England. Some of the cattle from the importer's farm were slaughtered at about this time and were found to be so badly infected with tuberculosis that the carcasses were totally destroyed. Tuberculosis was conveyed from the importer's farm to the farm under investigation, and after a time made itself manifest among the cattle on the place with the result that one of them died. Her carcass was hauled out to the feed lot and turned over to the hogs. After this date constant trouble had been experienced through the development of tuberculosis by the hogs of this field.

We must infer that the brood sows on this farm became infected through eating the tuberculous carcass of this cow, and that retaining the disease, they continued to infect their offspring for several seasons following. The sows were retained from year to year while their litters were fattened and sent to market, and it was in these young animals that tuberculosis was found to have developed to such remarkable proportions.

M'Faydean reports that a litter of young sucking pigs was referred to him for investigation because they were unthrifty, dull, and purging. The remaining swine of the farm consisting of a boar, three sows, and another litter of young pigs, all appeared to be perfectly healthy. The pigs were about seven weeks old at the time of the examination, and in spite of this early age all of them were found to be affected with generalized tuberculosis. No report of the sow which produced these pigs could be obtained other than the statement that she appeared to be quite healthy with no evidence of mammary tuberculosis. M'Fadyean considers it more than probable that a post-mortem examination of this brood sow would have revealed either tuberculosis of the generative organs or of the mammary glands. The first pig examined led M'Fadyean to decide that infection must have occurred previous to birth, while the lesions of the other two indicated a later infection by way of the digestive canal.

In an experiment conducted by the Bureau a sow was artificially infected by inserting a long hypodermic needle under the subcutaneous tissues of the mammæ parallel with the skin, and in withdrawing, a few drops of tubercle culture were allowed to flow gradually from the point of the needle. The litter of pigs born to this sow all became tuberculous, although the latter on post-mortem examination showed only six small subcutaneous abscesses the size of hazelnuts. Another experiment is now under way with a tuberculous sow having a litter of eight pigs; four of the latter are placed in a pen by themselves into which is thrown the fæces of the mother. Precautions have been taken to prevent any other source of infection. The remaining four pigs are likewise kept in a separate pen into which the sow is permitted to go only for the purpose of allowing the pigs to suckle. This experiment which is intended to ascertain the danger of the feces and the likelihood of contracting tuberculosis from the milk of an extensively infected cow has not as yet been completed.

INFECTION BY TUBERCULAR ATTENDANTS.

Attendants and caretakers who feed and care for the hogs should be free from tuberculosis, since hogs are susceptible to human tuberculosis, as has already been stated. Bang records the appearance of tuberculosis among hogs on a farm where the disease had never been seen before, which resulted from tuberculous attendants who were in the habit of spitting in the hogs' food and about the premises.

Judging from his comparative tests of human and bovine tubercle bacilli Dinwiddie reached the conclusion that pigs "are susceptible to infection with both bovine and human tubercle," and to judge from this test, "bovine tubercle is no more active for these animals than human sputum. The kind of pathological changes induced in the two cases are identical. The liability to generalization of the disease in pigs, a feature which has been noticed by other observers, is noticeable also in these inoculation experiments."

In a later review of these tests Dinwiddie states "pigs were found to be readily infected, and prone to suffer from a generalized disease by inoculation and feeding with both varieties of tubercle or tubercle bacilli in cultures."

The British Royal Commission on tuberculosis have also shown that hogs are susceptible to human tuberculosis. This Commission considers the power of resistance of hogs to the human tubercle bacillus to be considerably less than that possessed by cattle.

Knese reports the infection and loss of an entire litter of three months' old pigs consisting of eleven animals. These pigs had been bred upon the premises from healthy stock, and all possible sources of infection could be eliminated save that of sputum from a tuberculous daughter of the family, who was very sick with tuberculosis of the lungs during the entire summer, and who died from the ravages of this disease in the fall. During the progress of the disease, the young woman coughed badly, and raised large amounts of expectoration which was collected in a dish at the bedside. This dish was emptied into the yard each morning, then washed out, and the wash-water was likewise thrown out into the door yard. The small pigs had liberty to run about in the door yard each day, and undoubtedly became infected through contact with the human tuberculous sputum which was so freely placed within their reach.

In a recent conversation with Ryder, in charge of the Boston Station, he informed us that out of a lot of seventy-six hogs which had been fed upon swill gathered from some of the hotels of Boston, thirty-seven were found to be tuberculous at the time of slaughter. It is, of course, impossible to state positively that these animals were any of them infected through infectious material gained from tuberculous people at these hotels, but because of the possibility of such contamination, the case is mentioned. It should be stated in this connection that the cattle on this farm were healthy, having been frequently tested in the last three or four years, and there was no other apparent source of infection than the hotel swill.

INFECTION FROM TUBERCULOUS FOWLS AND CASTRATION WOUNDS.

The association of pigs and fowls has suggested the possibility in European countries that in some cases tuberculosis of hogs may result from exposure to chickens affected with tuberculosis. As avain tuberculosis is extremely rare in this country, little importance should be attached to this method of infection, although the finding of avain tubercle bacilli in hog tissues by Weber and Bofinger indicates that hogs are susceptible to this form of the disease.

The danger of infection of the scrotum at the time of castrating hogs, through the contaminated knife of the operator or otherwise, has been reported by Meyer. This method of becoming diseased is likewise of such rare occurrence that to mention it is sufficient for our purpose.

SYMPTOMS.

Few hogs ever show by outward symptoms that they are affected with tuberculosis. In fact the hogs that disclose tuberculosis at the time of slaughter are frequently the finest appearing animals in the drove when they are brought to the abattoir. Should indications of tuberculosis be present, they will usually consist of a general appearance of unthriftiness, which might result from other diseases and therefore does not afford any very definite indication that tuberculosis is present.

Where the disease progresses to an advanced stage of generalization various symptoms may appear. Abdominal tuberculosis is frequently accompanied by general disturbance of the digestive functions, and constipation or diarrhœa may be shown.

Advanced pulmonary tuberculosis will be shown by a persistent dry, harsh cough, and by acceleration in breathing, especially on exercise. This cough is similar to that caused by lungworms and cannot be differentiated from it.

Interference with both respiratory and digestive functions may be shown in case the disease is widely generalized, and the systemic alterations will be shown by progressive emaciation and weakness. Localization of the disease in bones or joints may produce lameness and other visible indications, but these are comparatively very rare. In those cases where the disease is not characterized by prominent symptoms but where the animals are suspected of having the disease, the tuberculin test is recommended. This makes it possible to slaughter the reacting animals in the early stages of the disease and thus obtain some remuneration for the carcasses and at the same time get rid of the infection. This is especially important in holding over brood sows, as our experiments have indicated, that both the milk and the feces of these sows may contain tubercle bacilli and thus infect the young pigs.

TUBERCULIN TEST.

In reviewing the questions of detection, and of eradication of tuberculosis in hogs, it is noticeable at once that there are but few recorded instances in which reliable tuberculin tests have been made. This may be due to the fact that the temperatures of hogs are subject to rapid changes, under conditions which would not cause noticeable variations with cattle. These alterations of temperature in individual hogs are so great within short spaces of time, and from apparently insignificant causes, that it seems at first glance that no change caused by the injection of tuberculin could ever, guarded from outside influences, be sufficient to permit one to reach any definite conclusion as to the presence or absence of tuberculosis.

In the experiments of Schroeder and Mohler of the Bureau of Animal Industry, recorded in Bulletin No. 88, it was found desirable to keep the hogs as quiet as possible during the test, it having been shown that excitement affects the temperatures of the hogs very quickly. Each hog was therefore placed in a rectangular crate about twelve hours before the first temperature was taken, and remained in this confinement until the tuberculin test was completed. The crates, while large enough to permit the hogs to get up and down easily, were still close enough to prevent their turning around, or moving backward and forward to such an extent as to interfere with the insertion of the thermometers. Crates that are made four feet long, one foot two inches wide, and two feet high, inside measurement, have proven entirely satisfactory in restraining hogs weighing from fifty to one hundred and fifty pounds. Unless use is made of crates or of some other satisfactory means of restraint, it is difficult, if not impossible, to obtain trustworthy temperatures of hogs.

The dose of tuberculin used was estimated on a basis of ½ c.c. for each hundred-weight or fraction thereof, of the weight of the animals tested. For instance, a pig weighing seventy-five or one hundred pounds would receive ½ c.c. of tuberculin, while one weighing one hundred and fifty or two hundred pounds would receive 1 c.c. The injections were made directly under the skin at the inner surface of the thigh, and in no instance were any harmful results noted, following the puncture.

For a practical tuberculin test it has been found sufficient to have the temperature of the hogs taken every two hours from 8 A.M. to 6 P.M. inclusive on the day of injection; and at the same hours on the day following, with the tuberculin injection made at 10 P.M. on the first day. The temperature before injection should be taken as frequently as after injection, and at corresponding hours, because of the very erratic character of the temperature of hogs, and because of the slight circumstances that may inadvertently be the cause of marked variations. It should especially be borne in mind that the value of the results obtained depends entirely upon keeping the hogs absolutely quiet during the whole of the test, and this point may be more readily gained if the animals are kept in their crates for twelve hours at least before the first temperature is taken.

In reaching a decision as to the presence of tuberculosis in a hog, as shown by the temperature readings, it is somewhat unsafe to base a condemnation upon the comparison of the maximum reading before injection with the maximum of the day following, but by averaging the temperature for the two days during which they have been taken, one is enabled to reach very satisfactory conclusions by comparing these averages. It is essential that the temperatures should be taken at corresponding hours on each day of the test, if results are to be determined by means of averages. By this method it was found in a test experiment with sixty-eight hogs that only two failures (less than 3 per cent.) occurred. In these tests no hog was condemned as tuberculous until it had shown a persistent average elevation of temperature of one degree throughout the second day. In the two failures mentioned one tuberculous hog failed to react, and another animal gave a reaction, but at post-mortem examination no tubercular lesions could be found.

A report has been received from Dr. Luckey, State Veterinarian of Missouri, which shows that hogs may be tested satisfactorily and to good advantage with tuberculin if handled quietly, and kept so closely confined that no chasing or driving will be necessary at the time of taking temperatures.

LESIONS.

The vitality of hogs or their powers of resistance to disease are necessarily lowered by the unnatural conditions which frequently obtain in hog raising, namely, the forced feeding for fattening and the small feeding pens in vogue in certain districts. When the enormous growth of a hog is considered, when it is realized that in the short space of eight or ten months a hog's development is frequently two hundred and fifty to three hundred pounds, a proportionate increase of weight unknown to any other species of domestic animals, the great metabolic changes which must necessarily occur can be appreciated. And such rapid development is very likely to take place at the expense of the disease-resisting powers of the animal. When tuberculosis results the lesions usually observed are discrete and of a chronic type, at times retrogressive and at other times slowly progressive, as manifested by calcareous deposits and fibrous encapsulation. It is not infrequent, however, that a more extensive and spreading disease is seen, and the lesions indicate a severe infection and rapid generalization of the bacilli, which in these animals may quickly follow the initial attack. And whether the disease assumes an acute, subacute, or chronic type, tuberculous growths may soon be found attacking lymph glands in widely separated parts of the body.

As the disease is essentially produced by ingestion, the glands and tissues associated with the digestive tract are the most frequent seats of infection. Indeed the superior cervical glands (in almost all cases the submaxillary gland) are nearly always affected, as at the post-mortem examinations held by Bureau inspectors over a consecutive period on 120,000 tuberculous hog carcasses, 93.3 per cent. were found to contain lesions in these glands. The large tonsils and the large number of lymph sinuses in the lymph glands probably account for this great frequency. Next in importance are the bronchial glands, of which 27.2 per cent. were diseased, while the gastro-hepatic chain of glands was involved in 21.6 per cent. of the cases. In all these cases the lesions may involve the entire lymph structure, or only the central or several irregular points, and may be either caseous, calcareous or caseo-calcareous. The mesenteric lymph glands showed lesions in 18.1 per cent. of the carcasses examined. The liver was affected in 9.2 per cent. of the cases and showed either yellowish miliary foci, which were caseous and scattered not only on the surface but also in the parenchyma, or the larger irregular nodules varying from a hemp seed to a shellbark in size. They are at times quite fibrous in consistency and may contain a caseous centre, or calcification may occur as the disease advances and the alterations become more considerable. The lungs are the next tissue to be most frequently affected, as is represented by 7.0 per cent. of the carcasses above recorded. The morbid anatomy of the lungs in this disease simulates that observed in human tuberculosis more than in cattle tuberculosis. In fact the disease bears many points of similarity to infantile tuberculosis in the human. There may be tuberculous pneumonia involving large areas of the lungs, causing collapse of the marginal portion. There may be irregular sized grayish or yellowish areas of caseation, as is so often seen in cattle, but not infrequently there are observed large numbers of miliary gray or translucent foci showing evidence of generalization as a result of the bacilli being disseminated by the blood stream.

The picture presented by tuberculosis of the spleen, which showed lesions in 3.8 per cent. of the above carcasses, is very peculiar to one who is familiar only with cattle tuberculosis. The spleen is usually darker in color and the surface is quite rough and nodular, depending upon the number and size of the tubercles. Unlike the spleen of a tuberculous cow, these nodules occur not often on the serous membrane but in the parenchyma. They vary from the size of a half pea to as large as a shellbark. The external pale or light red nodules are raised above the surface of the organ and frequently show fibrous tissue bands radiating from the centrally necrotic area. The lesions observed in the mediastinal glands are similar to those in other glands and were noted in 1.8 per cent. of the cases, while the sublumbar glands were found affected in .9 per cent. of the carcasses. The serous membrane may show an eruption of tuberculous granulations, and have been noted on the pleura in .1 per cent., and on the peritoneum in .006 per cent. of the cases. The generative organs are rarely affected. The bones, however, are more frequently attacked, those of the vertebral column, pelvis, and of the articulated extremities showing tubercular affection in .007 per cent. of the carcasses. Tuberculosis of the muscles has been noted, but not so frequently as of the bones and joints. The extreme rarity of lesions in the kidney is shown by the finding of but three cases in the 120,000 tuberculous carcasses. As an examination of the prepectoral, prescapular and inguinal glands were not made in all instances no percentage will be given.

Occasionally also, ulcers and tuberculous nodules are noticed on the mucosa or submucosa of the small intestines, especially of young pigs, but these likewise are rare, and when found usually accompany generalized lesions elsewhere in the body.

RELATION TO MEAT INSPECTION.

As you probably observed during your trip through the packing house this morning, the post-mortem inspection of hogs by the Bureau officials is very thorough, and is so ordered that tuberculous animals are quickly separated from those that are healthy. Without making mention of the various hands through which the hog passes while being unloaded after his arrival at the city, yarded, sold, weighed, driven to the packing house, killed, scalded and run through the scraper, we will meet him at the point where, lying on the travelling table, his head is almost severed from the body. Here he is examined by a veterinary inspector of the Bureau, who palpates, and if necessary, incises the submaxillary glands which have been exposed by the cut just made by the butcher for removing the head. Should these glands prove to be healthy, the hog is allowed to pass down on to the rail unmolested; if, on the other hand, these glands are seen to be tuberculous, the animal is marked, and is then run into a separate compartment called the retaining room, without being eviscerated. Most of the tuberculous animals are detected here at the header's bench, our records above given showing that 93.3 per cent. of the tuberculous hogs support lesions in the glands in the region of the throat.

From the header's bench the hogs which have not been tagged because of the tuberculous glands are sent along the rail to the gutter's bench, where another veterinary inspector is stationed, whose duties consist of examining each hog, giving special attention to the viscera. His search is not limited to the detection of tuberculosis, but he must watch for any of the diseases proscribed by the regulations of the Bureau. As there are a certain per cent. of hogs which support tuberculosis in the visceral organs without giving any evidence of the same in the cervical glands, the inspector at the gutter's bench is able to detect a number of tuberculous subjects in addition to those already tagged by the veterinarian at the header's table, being guided by the appearance of the lesions in the liver, spleen, lungs or visceral glands.

Another inspector has recently been installed, and he is stationed at the point on the line where the carcasses are split, it having been found that occasionally vertebral lesions and lesions of the serous membranes will exist, even when the visceral organs are apparently normal. Returning to the hogs tagged by the inspector on the heading bench, they are passed along to the retaining room, where they are eviscerated by a separate lot of butchers, using separate tools, under the supervision of a fourth veterinary inspector. By this method the affected parts or tissues are prevented from coming in contact with the healthy meats and are passed directly from the retaining room to either the condemned room or to the offal tanks, together with the condemned carcasses. In the retaining room by this time, there will be many hogs on the rail that are only slightly affected with tuberculosis, and these are now beheaded, split, trimmed, and passed on to the cooling rooms.

It is not a very difficult problem to pass judgment on the carcass of a hog affected with tuberculosis when the lesions are slight or when they are widespread. Most sanitarians are agreed in their opinion to pass the former class for food after removing the diseased parts and of condemning the latter class. In the great majority of hogs with lesions in the submaxillary, bronchial and hepatic lymph glands, or any combination of them, in which the foci are of the same character, size and consistence, and apparently of the same age, and in these cases it is not difficult to consider the animals infected by a limited exposure with resulting lesions in these various glands. Indeed, by experiments performed by the Bureau, where hogs were fed for two feedings on cultures of tubercle bacilli, it was observed that apparently some of the tubercle bacilli entered the submaxillary glands, while others lodged in the bronchial and hepatic glands at about the same time. These are purely primary lymphatic invasions, and these are the cases in which it is customary for the inspector to remove all diseased parts from the carcass and allow the remainder to be passed as suitable for food. The principle governing such disposition of this class of carcasses is, that there being no evidence that the tubercle bacilli have been taken up from the portal of entry to the body by the blood-vessels, there could have been no scattering of such organisms through the muscular parts of the carcass, and these may therefore be eaten with impunity. It is in cases of this class that danger from the development of tuberculin has been suggested. This, however, has been disproved by the experiments of Eber and ourselves.

The disposition of cases of generalized tuberculosis is also an easy matter, for it is evident that the infectious organisms have gained entrance to the blood-vessels, and by this means have been conveyed to all parts of the carcass, infecting the meat more or less completely. The rendering of such carcasses in the offal tank is the only rational disposition that can be made of them. There are other cases in which the development of disease has reached a stage which may admit some discussion as to the advisability of using the meat for food. Many tuberculous hogs are found that give no evidence of cachexia or wasting and that show on examination that the disease has not become generalized or extensive, although it has advanced beyond the point of primary glandular infection. Here the inspector must act carefully, trying to avoid the waste or loss of any meats that may be safely converted into human food, and at the same time being sure that nothing of a dangerous character is allowed to enter the cooling or cutting rooms. If the lesions of tuberculosis in the animal under his consideration are so located that they may be readily removed, a third method of disposing of the carcass may be selected. The carcass may be carefully trimmed, the tuberculous parts being consigned to the offal tank, while the trimmed meat, comprising the bulk of the edible portions of the animal, is placed in the lard-rendering tank, where it must be cooked by means of steam at a temperature not lower than 220° F. for not less than four hours for the extraction of the lard which it contains.

PREVENTIVE MEASURES.

The first step to be taken in preventing further spread of the disease is to remove all affected animals, whether hogs or cattle, from the premises, as these will only serve as sources of infection so long as they are allowed to mingle with healthy animals. In dealing with affected herds of cattle it has been found best in most cases to apply the tuberculin test to the entire herd as a means of selecting the tuberculous animals, but with a drove of hogs in which tuberculosis has appeared there can be no doubt that the best and surest method of procedure will in nearly every case be found in the slaughter of the entire drove as soon as they can be put in a marketable condition. This means of removing from the farm all of the centres of infection which exist among its swine is made possible and practicable by the ease with which a new drove may be built up from fresh foundation stock. With cattle, the offspring seldom number more than one per cow per year, and the young cow does not produce until two years of age. With swine, reproduction may be expected when the gilt is one year old, and instead of producing but one young at birth, from six to ten may reasonably be expected. If properly handled the first litter of young may be weaned in time to allow the sow to farrow again the same year. This shows how very rapidly a farm may be stocked with healthy swine after the total slaughter of a tuberculous lot. The early age at which the young sow may be bred; her capacity for breeding twice per year, and the plural number of her offspring are forceful arguments for the total destruction of every diseased drove of hogs, and the breeding up in clean, healthy quarters, of course, of a sound, healthy drove in its stead.

As tuberculosis seldom attacks the swine of a farm except through tuberculous cattle, the tuberculin test should be applied to all of the cattle on the place, and all tuberculous animals among them should be destroyed at the time of disposing of the hogs.

With the hogs all removed from the place and no tuberculous cattle remaining, attention should next be given to disinfecting the premises, that no centre of infection may be left to contaminate future purchases of live stock. The disinfection of pens and stables may be accomplished by thoroughly cleaning them, scrubbing the floors with hot water, brushing down all loose dust from the walls, and tearing out all woodwork which has become partly decayed. The interior of the pens or stables should then be carefully covered with a coating of lime wash containing one part of formalin to thirty parts of the lime wash, or four ounces of formalin to each gallon of the lime preparation. The yards should be carefully cleaned at the same time, especial attention being given to the removal of all rubbish and litter from the dark shady corners. Lime may then be sprinkled upon these dark portions of the yards, or a 3 per cent. solution of carbolic acid may be used instead. In all of the open portions of the yard the action of the direct rays from the sun will very quickly destroy all of the virulence of the scattered tubercle bacilli.

The premises now being cleaned, healthy foundation stock may be procured, and if proper attention is given to keeping the cattle of the farm free from tuberculosis, and to supplying the hogs with suitable food, the owner may feel every reasonable assurance that he has seen the last of tuberculosis among his swine. The trouble, time and expense required will be more than repaid by the advantages gained. In case the disease has only recently been introduced among the hogs, it would be advisable to apply the tuberculin test that the affection may be detected in the early stages in order that the hog raiser may clean up his herd with as little loss as possible.

The heating of all milk when received at public creameries to 176° F., or to 80° C., has been found most effective in preventing the spread of tuberculosis to the animals consuming the by-products of such creameries. Denmark was one of the pioneers in this movement, having in 1898 passed a law requiring all skimmed milk and all buttermilk to be warmed to 185° F. before it could be distributed from any creamery to its patrons for feeding purposes. It was found, however, that this degree of heat was harmful to the product, and in 1904 the required temperature was reduced to 176° F., experiments having proved that no tubercle bacilli could withstand such application. In practically all of the Danish creameries from this latter date the whole milk has been heated to the required point, thus assuring butter that is free from tubercular organisms, as well as by-products that are safe for use in feeding hogs or calves. The result of these regulations has been most satisfactory. The spread of tuberculosis to farms previously free, through the skimmed milk or the buttermilk from creameries, has been very markedly checked, and suppression of the disease in hogs has been plainly noticeable. Treating of creamery milk as a cause of the spread of tuberculosis among hogs, Moussou makes the statement that sterilization of the by-products of creameries and cheese factories results in the disappearance of tuberculosis of an alimentary origin among hogs fed with them, and the hog owners no longer fear losses from this disease.

Borgeaud has cited an instance in which a serious outbreak of tuberculosis among hogs was overcome by boiling all of the separated milk before feeding it to the subsequent litters of young pigs.

While pamphlets, popular articles and public notices would be extremely useful in eradicating tuberculosis in swine, it would probably be more satisfactory to explain the methods to be followed by the hog raiser by word of mouth. As this suppression of tuberculosis is entirely voluntary on his part, a powerful propaganda is of the greatest value, and the veterinarian is the best equipped man available for the work. The State should also assist by employing veterinarians to give public lectures in towns and townships, as is being done at present in Sweden. We now have absolute knowledge that the vast majority of cases of hog tuberculosis are produced by

(1) Raw milk and slime from creameries,
(2) Hand separated milk from tuberculous cattle,
(3) Feeding behind tuberculous cattle,
(4) Feeding tuberculous carcasses,
(5) Feeding slaughter-house offal.

It therefore behooves us as veterinarians to educate our clients as to the proper methods of preventing this disease, as we would recommend a proper feeding ration or proper construction of a stable. Inform our clients to (1) scald all raw products returned from the creamery; (2) to test their cattle if a hand separator is used on the farms, or in the absence of such a test, to scald the skimmed milk; (3) to feed only behind cattle that have not reacted to the tuberculin test; (4) to feed carcasses of animals that have died from any cause and offal from the slaughter house only after the meat and offal have been thoroughly cooked.

Sooner or later the packer and slaughterer are going to buy hogs subject to the post-mortem inspection, as they are at present doing in some of the large packing centres with certain classes of female cattle, and the hog raisers who in face of the advice obtained from his veterinarian, his stock papers, or elsewhere, continues to fatten his hogs as of old, should be made to sustain the losses arising from his lack of knowledge, skepticism or indifference, and not the innocent purchaser who cannot be familiar with methods of feeding in vogue on the farms of the different breeders. Nor should the intelligent hog raiser who produces healthy hogs by carrying out minutely the known and proved methods of prevention be obliged to bear a portion of the burden of the careless or ignorant hog raiser as at present. To-day the hog buyer must make his purchases with the absolute knowledge that a certain proportion of his purchase will be condemned for tuberculosis, and as the post-mortem examination is the only key to the extent of the disease, the careful breeder must suffer equally with the careless one. This is not equitable. When the packer buys subject to the post-mortem results the intelligent hog raiser will get more for his healthy hogs than now, and the ignorant breeder less for his tuberculous hogs, as it should be. It would be money well expended if butchers and packers who are losing so much from hog tuberculosis would employ veterinarians in their vicinity to write popular articles giving correct views on how to suppress tuberculosis on the farm and mail them to their hog shippers and hog raisers in furtherance of this plan of eradication. Extermination of hog tuberculosis is practicable, relatively easy, and should be attained without delay, before the disease has gained too much headway.

One of the favorable steps in this direction, and one that will undoubtedly tend to check the advance of tuberculosis, is the enactment of the following laws by the States of Iowa and Minnesota:

LAWS OF THE THIRTY-FIRST GENERAL ASSEMBLY OF THE STATE OF IOWA (1906).

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That every owner, manager or operator of a creamery shall before delivering to any person any skimmed milk cause the same to be pasteurized at a temperature of at least one hundred and eighty-five (185) degrees Fahrenheit.

SECTION 2. Whoever violates the provisions of this Act shall, upon conviction, be liable to a fine of not less than Twenty-five (25) Dollars, nor more than One Hundred ($100) Dollars.

General Laws of Minnesota for 1903 to Prohibit and Prevent the Manufacture or Sale of Unhealthy or Adulterated Dairy Products.

Be it enacted by the Legislature of the State of Minnesota:

Section 10. That all creameries before delivering to any patron any skimmed or separated milk shall have pasteurized the same at a temperature of at least 180° F.

Similar laws to the above are at present being considered for Wisconsin and Illinois, but have not as yet been enacted.

DISCUSSION.

Dr. Noack: Mr. President and Gentlemen: I have followed with very great interest the two papers read by Dr. Melvin and by Dr. Mohler respectively, because I have done a great deal of work in this line for the state of Pennsylvania, and have come in contact with tuberculosis in cattle as well as in hogs. As to the eradication of tuberculosis in cattle, and in men, I must say that I am not so well qualified to speak as Dr. Melvin, but I feel that we shall succeed to stamp out tuberculosis in a short time. I have come in contact with farmers, I have tested cattle and I have told them how to disinfect their premises, but they took very little interest in the matter They did not seem to realize the importance of what I told them. In some instances they did it for a short time in a half hearted way, and we might say it might have been better had it not been done at all. Cows afflicted were isolated or killed, but the isolation was not done properly and shortly afterwards the farmer went on buying cows without having them tested, and what was the result,—tuberculosis remained and tuberculosis still is there. Therefore, I think we hardly will live to see the eradication of tuberculosis. It will come, but it will take many, many years, because we have to teach and enlighten the farmers on the importance of taking proper sanitary measures to destroy the germs of the disease. We have to teach the farmer and we have to get at the dealer in cattle, because these two will always be in opposition to our work.

As to communication of tuberculosis from cattle to hogs, I will just bring to your attention one farm where I had to test cattle. I was called there because the owner found every hog which he killed afflicted with tuberculosis and so badly that they had to be thrown away. They had been fed on the milk from these cattle. I tested this herd consisting of 65 head of cattle of which 48 reacted. I told the man to clean up the stable. I told him how and to bring a physician to do it, and he certainly understood me. I think it was his intention to do it well, but as a fact, his men did not do it well. The consequence was, I tested this herd some months later, and out of 18, I found nine that were afflicted. This time, I told him that he should look after the men who disinfected the stable. Before he had met with laxity on their part because this work was hated and on account of it practically amounted to nothing. I told the owner that the work must be done this time in a proper manner. It certainly was hard work. The men were not willing to do it as they were told, but we succeeded, and in a short time there was but one case of tuberculosis.

Further I shall give you an example of antipathy in this direction, that happened two weeks ago. I was called to examine a herd. It was the first examination here. The herd looked well. There was only one animal that showed symptoms of tuberculosis, and two others showed sharp viscular noise in the lungs on osculation, therefore I was not quite sure whether it was tuberculosis or not. I was ordered to test those cattle two weeks later. These two showed more pronounced symptoms at this time, which made me safe to diagnose the ailment as tuberculosis. I tested nineteen. I found fourteen out of the nineteen which reacted. Now the farmer was up in arms and thought that it was impossible and he wanted to have his cattle retested. This is only another instance of dislike of sanitary measures I could mention many other cases, because I have handled meat inspection for the abattoirs for about four or five years. The state of Pennsylvania makes an allowance for all cattle which are condemned and unfit for food. But the farmer has to swear ownership of the condemned animal. Rather than swear to this, the farmer prefers to lose the money for the animal, fearing that an examination of his herd would be made and more cases found. These are the conditions as we find them in Pennsylvania. I think they are hardly better in any other state. For the last two months I have been inspector for the state of Pennsylvania, and I have had the opportunity to examine hogs in the abbatoirs for tuberculosis. In one establishment where I examined 45 hogs, I found 17 afflicted with tuberculosis. Eight were raised in the neighborhood and the rest came from the West. It was impossible for me to ascertain from where they came and how they were fed to account for the large number of tubercular animals. In another instance where a lot of 55 were killed, we found five.

I just give these instances to show with what difficulties we have to deal in the fight against tuberculosis and to call the attention of the veterinarians to this matter, for I hope that we shall succeed to a greater degree in the future than we have in the past, eradicating tuberculosis.

Dr. Nesbit: Mr. President, I would like to ask if the tuberculin test is applicable to hogs?

Dr. Mohler: With reference to the question regarding the applicability of the tuberculin test to hogs, I would like to say that the results of the experiments along that line have been incorporated in the paper just presented, although they were not read owing to the lack of time. A detailed description of the method of tuberculin testing hogs will also be found in Bureau Bulletin No. 88. Briefly, it was found by these experiments that the principal difficulty encountered was in the control of the animals, and the only way by which this was effectively accomplished was to construct crates and place the hogs in them about twelve hours before starting to take the preliminary temperatures. This allowed the animals to become accustomed to their new quarters and prevented the irregular flights of temperature so frequently observed in hogs. Under these conditions we found that by taking six temperatures two hours apart, beginning at 8 A. M., before the injection that we could determine the average normal temperature. The tuberculin was injected on the inside of the thigh at 10 o'clock the same evening, giving about 0.5 c.c. to each 100 pounds or fraction thereof of body weight, and on the following day the temperatures were again taken at the same hours as the day before. But, unlike the method of interpreting the temperature record in testing cattle, we took the average of the six temperatures after the injection and compared it with the average of the temperatures before injection, in order to arrive at a conclusion. It was observed in testing tuberculous hogs with tuberculin that the temperature after injection does not go so high as in tuberculous cattle, but it persists for a longer period of time, so that it is essential to compare these averages. And when we found that the difference in these averages amounted to a rise of one degree or over, it was considered as sufficient evidence for diagnosing tuberculosis. Up to the present time more than 200 hogs have been tested and tuberculin has proved an accurate diagnostic agent in about 97 per cent. of the cases as determined by post-mortem examinations.

MILK AS AFFECTED BY STABLE PRACTICES AND SUBSEQUENT HANDLING.

BY M. H. REYNOLDS,
Professor of Veterinary Medicine, University of Minnesota.

The quality and wholesomeness of milk is a matter of such fundamental importance that surely no excuse is needed for presenting it here. The enormous extent to which it is used as a food for children and even adults; the extent to which it is used as food for growing calves and other live stock; the ease of infection, and the fact that bacteria multiply readily in it; the comparative ease of producing wholesome milk and the very grave dangers from bad milk all emphasize the vast importance of the subject. Those who are not working with these problems do not realize the importance of milk and its products as food materials; few of us realize actually and clearly the great importance of having it clean and normal; and few realize how very dirty and unsafe, clean looking milk may be. Some figures may serve to bring this home:

During the last twenty-five years our medical journals have published accounts of 195 typhoid fever epidemics, 99 epidemics of scarlet fever, and 36 of diphtheria, which had been traced to milk supply. Our Federal Bureau of Public Health and Marine Hospital Service traced 85 of 866 typhoid cases in the District of Columbia to the use of milk. Note that this is about 10 per cent. of the total.

Approximately one-half of the deaths in children less than one year of age are due to gastro-enteric diseases, mainly infantile diarrhœa; 54,047 deaths among infants have been traced with reference to feeding. Of these 86.6 per cent. had used artificial foods. Cow's milk is the staple artificial food for infants. This makes, or seems to make, out a rather serious case against milk as the medium by which the injurious material was conveyed. Can medical men doubt that milk or rather those who produce and handle it, must be held responsible for a serious and useless sacrifice of human health and life.

Recently the writer came across an interesting record of three cases of infectious enteritis in the human from milk contaminated with the excreta of a cow, also an outbreak of scarlet fever which was traced directly to milk. There are plenty of instances of this kind for one who cares to pursue the study.

METHODS OF POLLUTION.

Under very common conditions and methods of milking, there is practically always more or less pollution. This comes from dust in the atmosphere, which may or may not be carrying pathogenic bacteria. It may come from dairy cows; it may come from dirty hands of the milker; or from the clothing of milkers; or from milk utensils that have not been properly cleaned. Milk in transit is exposed to possible multiplication of germs from unclean containers and high temperatures. Bacteria of innumerable varieties and other foreign matter may have been left in vessels from previous use, and bacteria multiply with great rapidity at temperatures above 50° F. Contamination may occur in the city milk shop, in the creamery, and in a variety of other places. In the city, milk is exposed to contamination from filthy street dust; to contamination from dirty hands or clothing of handlers, or from impure ice or impure water used in diluting or washing.

A very objectionable procedure which has been reported where milk is sold in bottles, is that of collecting bottles which presumably have not been sterilized, possibly not washed, from one house, refilling them in the wagon en route to the next customer and then delivering the same bottles to another family. A better method for disseminating certain diseases could scarcely be suggested.

A few homely illustrations of points that are often overlooked will suffice.

Milk should be removed from the barn as soon as drawn, and kept in a milk house or room apart from the stable. The milk house should be screened. Flies should never have free access to milk or milk containers after the latter have been cleaned. Think of the character and variety of filth, and infection which flies may easily transfer to the milk or container.

The milker should always wash his hands thoroughly before milking, and should then milk with dry hands. Think of the dirty personal habits of some milkers, and the possibility of contamination with colon bacilli and other material still less desirable. How many milkers in the average city dairy do carefully wash their hands before sitting down to milk.

Considerable numbers of milkers right here in Kansas City probably work with wet hands. They do in other cities, *i.e.*, they first milk on each hand, then commence milking into the pail with dirty milk-covered fingers. This sort of a thing isn't Yellow Journalism; it's cold history.

What about the shallow wells that receive surface drainage, and are located in close proximity to the barn yard and milk house? Such water is used for rinsing the cans, perhaps after they have been scalded, and, possibly a little of it may be used occasionally for dilution.

Bacteria in Air.—For the purpose of comparison later it may be interesting to study the prevalence of bacteria in free air from an open field or meadow with that taken from the barnyards and stables, as presented in Bulletin 91 from the Illinois Experiment Station. A large number of agar petri dishes were exposed in open field and an average of 43 exposures gave but .9 of one colony. Fifty per cent. of the plates were sterile. Of 51 exposures made in the barn yard, 12 per cent. were sterile and the average was 13 colonies per plate. Exposures made in stables under various conditions ran as high as 858 colonies per plate, and as low as 2, depending on how dirty the stable, how much dust and in general, what was going on in the stable.

In one experiment comparison was made between the bacterial condition of the air when the barn had been emptied, with doors and windows shut for three hours, and conditions in the same stable after the cows had been let in and feeding and sweeping had been done. When the barn had been emptied and quiet for several hours an average of six exposures gave but one-half a colony per plate. This means that the dust particles had settled and there were no air currents to stir them up again. After cows had been replaced in the stable, and the usual stable operations had been gone through with, the bacterial count per plate averaged 151 colonies and ran as high as 412, showing the effect of handling dry food and sweeping,—things which should not be done during milking nor for a considerable period before milking.

A little later, after fifteen cows had been brushed, two exposures gave an average of 858 colonies per plate.

BACTERIA IN AIR

			PLACE	COLONIES
AV.	43	EXP.	FIELD	0.9
”	51	”	BARN-Y'D	13
	1	”	” FL'R	718

FRASER ILL.

J.R.

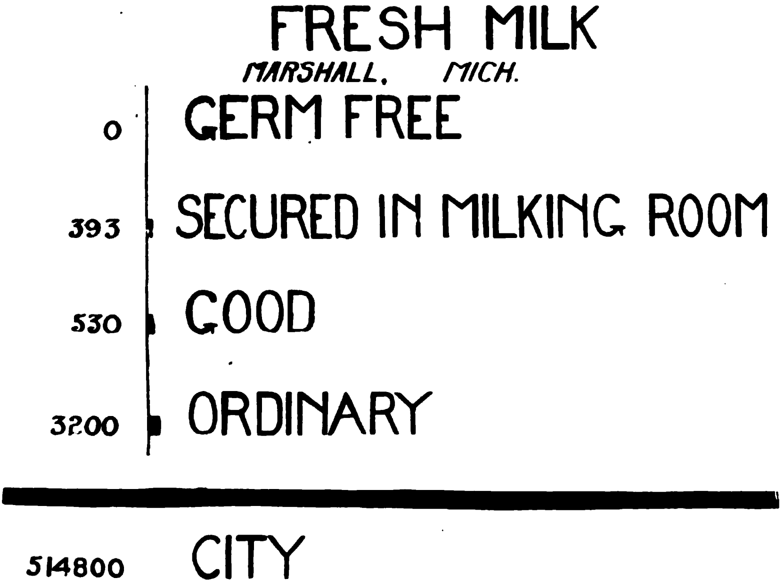
VII

MULTIPLICATION OF BACTERIA

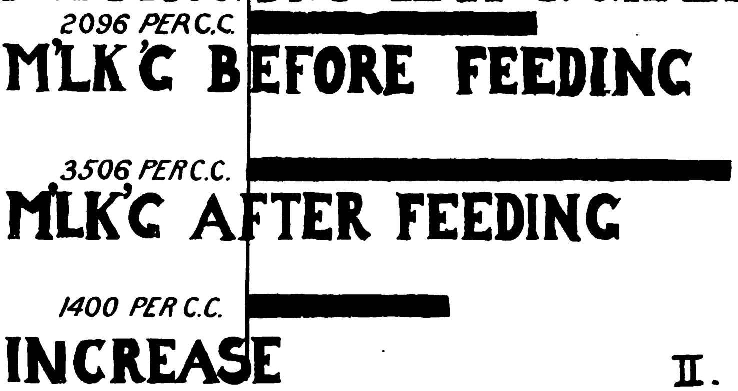
BACILLUS DIVIDING EVERY 30 MIN.

BEGINNING WITH ONE ORGANISM.

1/2	HOUR	2	”
1	”	4	”
1-1/2	”	8	”
2	”	16	”
3	”	64	”
4	”	256	”
5	”	1024	”
24	”	17 000 000	”


FRESH MILK
MARSHALL, MICH.
0 GERM FREE
393 SECURED IN MILKING ROOM
530 GOOD
3200 ORDINARY
514800 CITY

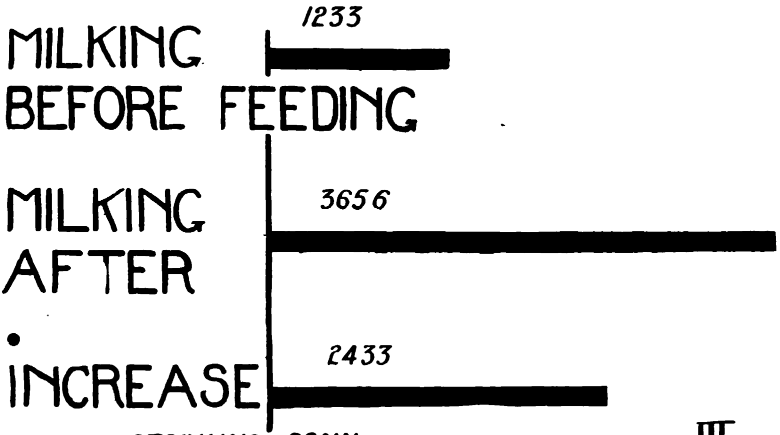
BACTERIA IN MILK
FEEDING DRY HAY & GRAIN



II.

STOCKING, CONN.

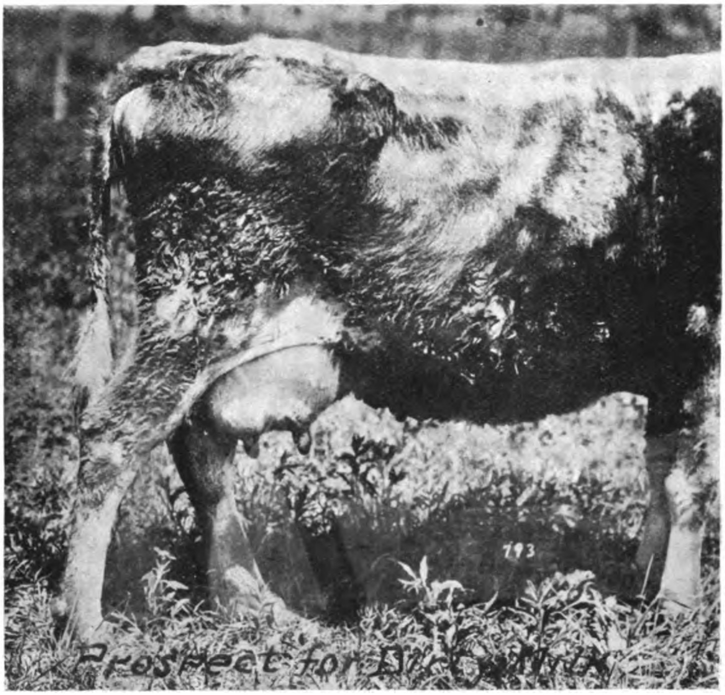
BACTERIA IN MILK
FEEDING DRY CORN STOVER



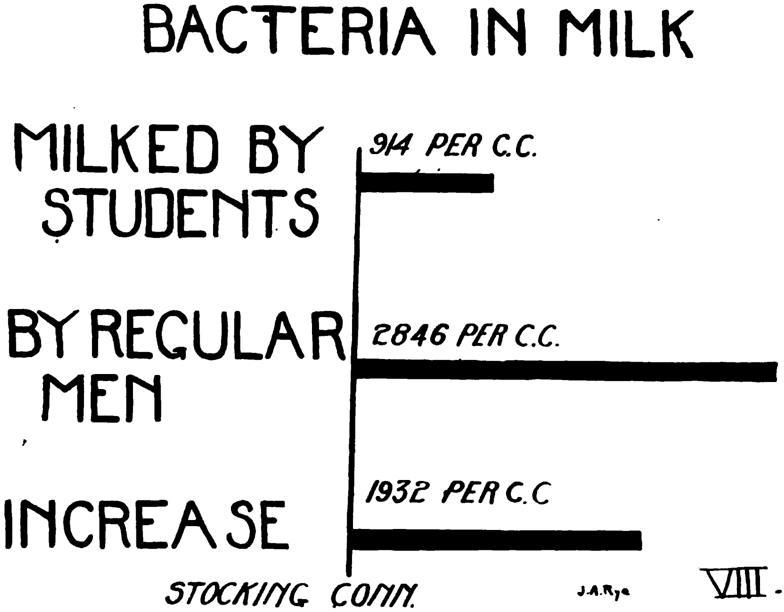
STOCKING CONN. J.A. Rye

III.

A prospect for clean milk (Fraser).



A prospect for dirty milk (Fraser).



STOCKING CONN.

VIII.

In another series of experiments, plates were exposed under the udders of cows, some washed and others unwashed. The average number of colonies developing in the plates exposed under washed udders was 192, and under udders that had not been washed, 578. In this experiment 420 petri dishes were exposed, so that the work was done on a sufficiently large scale to be reliable.

Another interesting experiment, if not an agreeable subject for consideration, was in a study of the amount of dirt which falls into milk during the process of milking, comparisons being made by weight. Seventy-five tests were made. The udders were divided into three groups—apparently clean, moderately dirty, and muddy. The average amount of dirt from the muddy udders, unwashed, was found to be about .88 of a gram. From the udders slightly soiled there was about .13 of a gram. From the apparently clean udders about .01 of a gram. The unwashed udders gave from 3½ times as much dirt with the clean udders, to 90 times as much dirt with the dirty udders, as the washed. The author of this bulletin concludes that by far the greatest amount of contamination comes from the udder, under ordinary conditions of milking.

Bacteria in Milk.—The number of bacteria in milk just drawn varies greatly in the estimates of different authorities, but in general we may say ordinarily from 200 to 100,000 per c.c. of milk, depending upon cleanliness of cow, milker, utensils, air currents, dust, and other conditions.

The Storrs Experiment Station (Connecticut) has recently issued a bulletin on the " Quality of Milk as Affected by Common Dairy Practices," wherein certain important points are very wisely emphasized, and the results of very important experimental work is given.

The first experiment reported was in connection with the custom of giving dry feeds at milking time. It is very easy to understand that all dry feeds are liable to contain considerable dust or at least to stir up dust in the process of handling. Some are liable to be covered with mold spores. Dust is very apt to be laden with a variety of germs, some harmless, others objectionable. Large numbers of such dust particles can hardly fail of falling into the ordinary open pail or can.

In the experiment alluded to ten cows were used, and were divided into two groups, one group being milked before feeding and the other after feeding. Dry hay and grain were used in this experiment. The Stadmueller covered pail was used and of course the amount of dust and number of germs getting into the milk from the atmosphere would be very much less than had ordinary open pails been used. The two groups of cows were changed each day to avoid errors which might otherwise have arisen. Milking was done by the same man and all conditions as to feeding were as nearly identical as possible. The hay was of good quality. It was delivered through a chute from the floor above into a feeding alley and fed without unnecessary handling. The grain used consisted of bran, cottonseed and gluten. This was taken from a chute and delivered along a feeding alley to the cows. The results of the experiment are interesting, especially when we remember that milk-souring germs, milk-peptonizing germs and disease germs, if present would be distributed to the two samples of milk in about the same proportion as the harmless bacteria. The average number of bacteria in the milk taken before feeding was 2096 per c.c., while the average for the milk drawn after feeding was 3506, a difference in favor of feeding after milking of over 1400 per c.c. Had this milk been received in an open pail, kept warm, and shipped fifty miles to market or hauled about town several hours in a milk wagon without ice in July, the difference might have been multiplied indefinitely.

Another similar experiment was in connection with the feeding of dry corn stover at milking time. The conditions were about as in the preceding experiment and the results even more suggestive. This and similar experiments would have a special significance if stover or hay used should be moldy. In that case the atmosphere would be filled with innumerable mold spores in addition to the usual dust-carrying bacteria, and the pathogenic possibilities of mold spores are growing more and more interesting as our literature on the subject develops.

A third experiment was one in which milk from cows whose udders were wiped with a damp cloth at the time of milking was compared with others whose udders were not so cleaned. In this experiment again there were used two groups of cows, five in each. One group was milked without any usual care to avoid dust or dirt,—just ordinarily clean, dry milking. The other group had the flanks and udders wiped with a damp cloth, and the groups were reversed daily. The milking was done by the same man and the Stadmueller covered pail was used. The average number of bacteria per c.c. from the cows whose udders were wiped was 716; the average number from those not wiped was 7058, a decrease probably due to the damp wiping, of 6342 bacteria per c.c., or a decrease of 6,342,000 per gallon. These were not all disease-producing bacteria by any means, nor were they all bacteria capable of producing objectionable changes in milk. Many of them were milk-souring bacteria, others belonged to the group which produces liquifying changes in milk. Some may have been infectious—disease-producing bacteria. These cows were at an Agricultural College, and were kept much cleaner than would be the case in an average city dairy barn. If milk from cows kept in an average city dairy, for instance, should be compared with milk from cows whose udders and flanks were reasonably clean, and then well wiped with a damp cloth, the difference would be startling.

A further experiment was done at the Storrs Station in an effort to secure information concerning the effect of brushing cows at milking time. It is not an uncommon practice among dairymen to brush cows before milking for sake of cleanliness, so this presents a study of a very practical feature. A study of their results shows that there were uniformly many more bacteria in milk from cows that had recently been brushed than in milk from cows not so brushed. The explanation is simple and the results are just what one might expect. Brushing the cows merely freed considerable quantities of bacteria-laden and very objectionable dust. Some of this dust fell into the milk.

This same station has also demonstrated in a very practical and intelligent way that the individual milker has very much to do with bacterial cleanliness of milk. In one experiment five college student milkers were compared with two regular men, milking in college stables, but not having had special instruction. The students had previously some instruction concerning dairy bacteria and concerning clean methods of milking; but both parties of milkers followed the same routine. The flanks and udders of the cows were wiped with a damp cloth by both groups of milkers and the Stadmueller covered pail was used. The average bacterial count per c.c. for the students was 914, and for the regular men 2846—three times as many. In some individual cases milk drawn by regular men showed more than nine times as many germs as that taken by the students.

Another and similar experiment was still more suggestive. The same two regular milkers were compared with a graduate of the college who had charge of the dairy herd. The regular milkers attempted to follow the same routine as the graduate, having been instructed somewhat concerning the procedure. The average for nineteen experiments in the test now under discussion shows that milk drawn by the college graduates contained 2455 bacteria per c.c., while under similar conditions the regular milkers obtained milk containing over 17,000.

The milking machine presents a rather peculiar problem in this connection. It seems probable that a practical milking machine is now in sight or at least a thing of the very near future. From work already done, it becomes evident that milk drawn by machine may either be superior or indefinitely worse than hand milk, depending upon the intelligence, care and honesty with which it is used.

Edwards[1] has shown that when the machine which gave best satisfaction was cleaned, and used according to directions of manufacturers, its milk bacteria-count was very much higher than for milk drawn by hand, but when extra precautions were taken with the machine, its milk compared favorably with hand-drawn milk.

Milk drawn by this machine, when the latter was taken care of according to manufacturer's directions, gave an average count of approximately 500,000 per c.c. The average for hand-drawn milk was about 23,500, but when the machine had been subjected to recent sterilization, the average count was 38,000, some counts being below 16,000.

In view of this prevalence of dust in dairy stables, and the fact that dust particles are usually bacteria laden, it becomes a very interesting study, if one offers the query, what if these dust particles are carrying considerable numbers of the pigment-forming bacteria which produce red milk, or yellow, or green, or blue milk?

Or suppose that these dust particles are loaded with yeasts and various species of bacteria capable of producing alcoholic fermentation, or with Hueppe's lactic acid bacteria, or some of the numerous species of bacteria capable of producing butyric acid fermentation with its disagreeable odor.

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[1] Ont. Agr. Col. Bulletin, 159.

These dust particles may also be carrying considerable numbers of the micrococcus, which produces bitter milk; or specimens of the numerous varieties of bacteria which may produce ropy milk. Infinitely worse these dust particles may be carrying bacteria which are capable of producing intensely active poisons like tyrotoxine. And then suppose further that the milk is kept warm for a few hours.

A considerable portion of stable dust must be considered as filth, manure if you please, rather than ordinary dust. Dr. Marshall estimates that the dirt usually found upon a cow, or about the stall, or on the dirty clothing of the milker, may contain up to 80,000,000 bacteria per gram of dirt, and that 50 per cent. of the dirt that falls into the milk is soluble and of course cannot be strained out or removed under ordinary conditions. Other authorities state that 80 to 90 per cent. is soluble. This would mean that only 10 to 20 per cent. can be strained out, and that the uninviting collection which appears on the strainer represents only one-tenth or so, and the other eight or nine-tenths are in the milk to stay.

Backhaus is quoted as estimating that the people of Berlin swallow 300 pounds of this kind of filth per day, or about 109,500 pounds, or 54½ tons a year, enough for quite a garden patch. The amount that is consumed by the people of our own cities, Kansas City, for instance, or Minneapolis, may properly become a subject for unpleasant conjecture.

It is not well enough understood that one of the serious sources of milk contamination is from dirty pails and other utensils, and that good milk cannot be put on the market from a dairy that is not intelligently clean in this respect. Dr. Marshall reports from 500,000 to 50,000,000 germs per gram of dirt taken from creases in the milk pail, and many thousands from each inch of the inner surface. Startling? But they are easily destroyed.

In the course of some recent experimental work with manure from tuberculin-reacting cows at the University of Minnesota Experiment Station, we have found one cow that gave very virulent feces, as shown by guinea pig inoculations. We had previously found another cow that gave enormous numbers of an acid-fast bacillus, comparing closely in every way with the tubercle bacillus but which unfortunately was not tested for virulence. However, this cow was known to be tuberculous, and had what was supposed to be a tubercular diarrhœa. Imagine what could have easily happened with either or both of these cows in an average city dairy with manure smeared on the tail, thence on the udder and flanks, and some one sits down to milk after it is dried. I quit unknown restaurant milk sometime ago.

Dr. Repp reported a very interesting case of a tubercular cow in a paper before the A. V. M. A. in 1903, where tubercle bacteria occurred in the intestinal mucosa in enormous numbers, and in smears from the surface of this membrane. Imagine this cow in an ordinary dairy or a cow with tuberculous ulcers on the intestinal mucosa like that shown in a certain cut in Dr. Moore's "Pathology of Infectious Disease of Domestic Animals."

Schroeder and Mohler,[1] and Schroeder and Cotton,[2] have recently reported a serious case against the manure of tuberculin reacting cattle.

To make this a serious consideration it is not necessary to suppose that the manure becomes smeared on the udder or flank, although this would almost certainly occur. Suppose that it becomes dried in the floor and particles float up in currents of air—What then? Here and there doors and windows are open and dust flies, settling in milk pails or upon food soon to be given cattle, and infection of some one's children or some one's calves or hogs may easily follow. In this connection we see the serious importance of such considerations as those just presented in the work quoted from the Connecticut and Illinois Stations, concerning stable dust.

Tuberculous cows may unquestionably cough up then swallow infectious material and excrete tubercle bacilli in the manure. In work recently reported by Schroeder and Mohler, of the Bureau of Animal Industry (Bulletin 88), evidence on this point is given. Cattle were given virulent cultures in water and fed heavily on corn, so that considerable quantities of corn would appear in the manure. This was thrown into an experimental pig pen to four hogs. You will see that this is an experiment bearing upon the common practice of allowing hogs to follow steers which may not be objectionable if the steers are not tuberculous. Three out of four hogs become infected in this way. In another experiment the manure from cattle known to be tuberculous was put in an experimental pen of four hogs and one became tuberculous.

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[1] Bureau of Animal Industry (Bulletin 88).

[2] Bureau of Animal Industry (Bulletin 99).

Creamery skim milk in States where there is no law compelling pasteurization, may thus easily become a serious source of tuberculosis among hogs. But the infinitely more serious suggestion is that tubercular bovine feces may possibly contaminate milk intended for human food. Authorities like Von Behring are now insisting that infection in the human usually comes by ingestion, and that in early life, *i.e.*, at a time when milk is the exclusive diet.

SOMETHING DUE FROM THE CONSUMER.

There is another side to this question—the producer's side. He has right as well as the consumer. People must be made to realize the difference between good milk and bad milk, and be willing to pay for quality and cleanliness. It takes an intelligent man and a considerable amount of executive ability and agricultural knowledge to produce clean wholesome milk. It is more expensive to produce milk of this kind, and we must be willing to pay for it. Very cheap brains and very cheap stables can produce dirty milk.

A single point will serve to illustrate. For preservation by cold, milk must be kept at 50° F. or below. A temperature of 58 or 60 is of little avail, for at temperatures above 50° F. bacteria in milk increase with marvellous rapidity. Petruschky quoted by Harrington shows that " At room temperature a streptococcal content of about 300 per c.c. may increase in twenty-four hours to 10,000,000, but this same milk kept at a temperature of 50° F. yielded but 30,000 bacteria; " *i.e.*, the bacteria multiplied about 300 times as fast at room temperature as it did at 50.

A temperature of 50° or lower calls for ice, and ice costs money. If the consumer wants to have milk that has been kept cool, he must expect to pay for this increased cost. A model dairy farm, properly equipped and managed, cannot compete on even prices with a dirty dairy. It is important that our people understand this.

Minneapolis has recently had an experience which may be suggestive. One of our wealthiest men established an almost ideal certified milk plant. He had the best cows, thoroughly modern stables, and a first-class milk plant in every respect. The feeding and care of the cows, milking operations, cooling of the milk, sterilizing of bottles, bottling, etc., were all that could be desired, and the milk produced in this plant was unusually clean and free from bacteria. The average bacteria count was very low. The milk was without a trace of animal odor; kept splendidly and was delicious to drink.

Our people had not been made to realize the difference between clean milk and dirty milk. Our veterinarians, physicians, ministers, editors and teachers had evidently not done their duty in educating the public, and a very large proportion of the people in Minneapolis could not see any reason why they should pay more for this milk than for dirty stuff which would scarcely keep sweet in a refrigerator over night. Our plant was not appreciated and we lost it.

MUNICIPAL CONTROL WORK.

Any efficient and practical municipal regulation should cover at least these features: viz., there should be a specific content of butter fat which should not be too high; no foreign material should be added for preservation, or any other purpose except perhaps by a promising new method of preserving milk by the use of peroxide of hydrogen which is subsequently driven off by heat. If any method of preserving milk can be demonstrated efficient and harmless, it should not be prohibited, inasmuch as it does not seem possible in many cases at present to have milk pass from cow to consumer quickly enough so that the milk may be delivered in the best condition. However, as a general proposition, the statement must remain for the present that milk should be delivered to the customer as normal milk, except that certain classes should first be pasteurized if delivered at all.

A committee of eminent men was appointed not long since by the commissioners of the District of Columbia to consider and report upon the local milk supply.[1] It reports strongly in favor of a central milk plant where all milk for the city should be received and prepared for distribution. It is argued that at such a place it would be possible to have suitable conditions for handling, storing, pasteurizing and sterilizing. This plan would presumably do away with the local dealer's method of bringing in milk by wagon and distributing it to consumers or else the proposition could apply only to milk that is shipped

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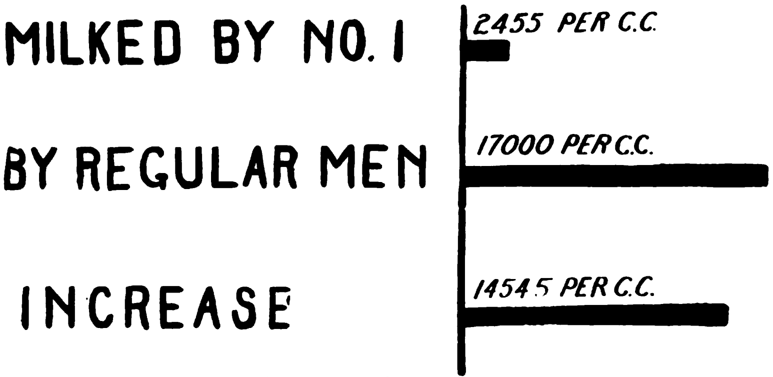
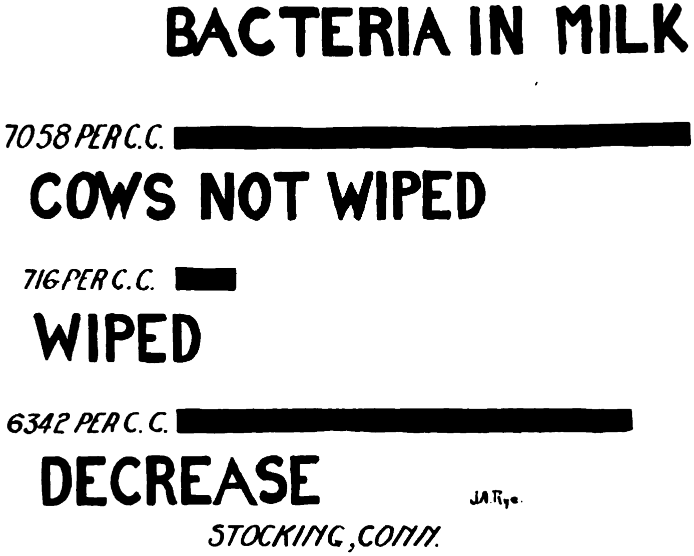
[1] Bureau of Animal Industry, Circular 114.

BACTERIA IN MILK

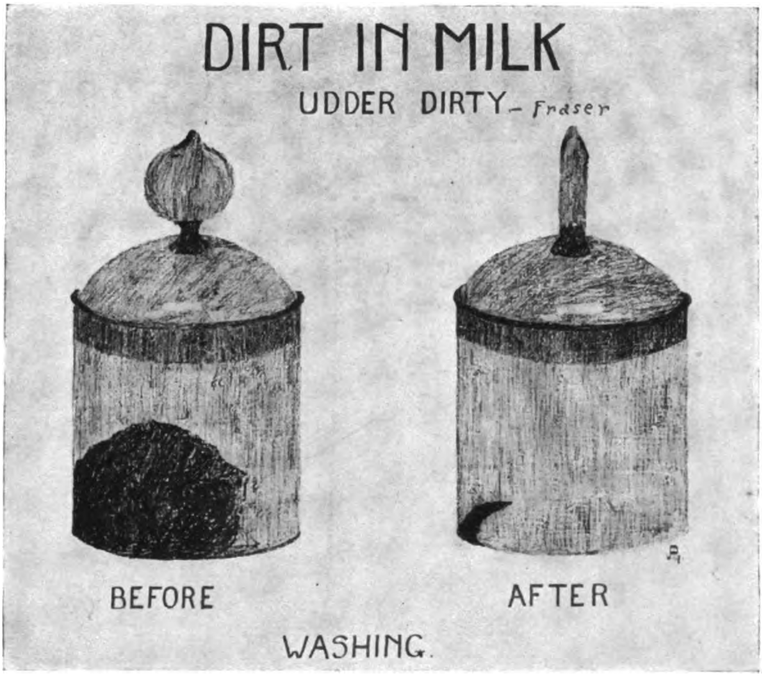


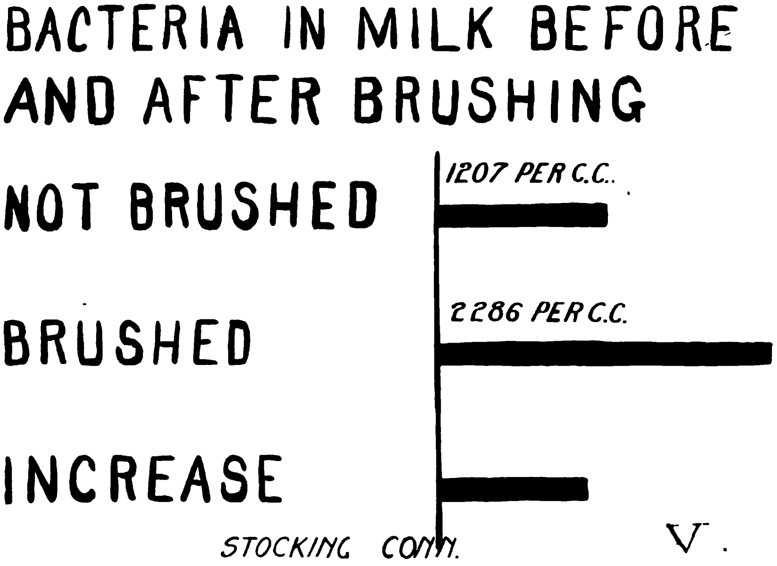
STOCKING CONN.

IX.

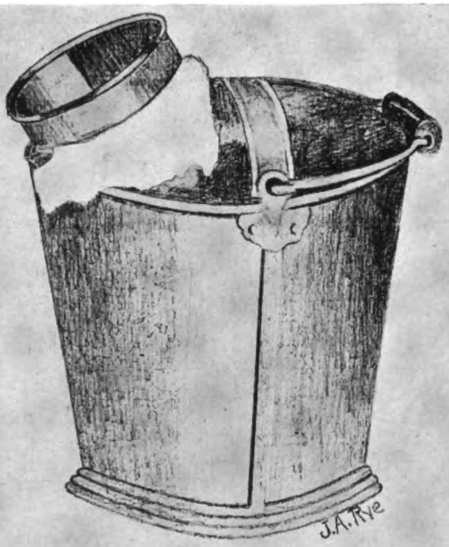

BACTERIA IN MILK
7058 PER C.C.
COWS NOT WIPED
716 PER C.C.
WIPED
6342 PER C.C.
DECREASE
J.A.Rye.
STOCKING, CONN.

IV.


DIRT IN MILK
UDDER DIRTY – Fraser
BEFORE
AFTER
WASHING.

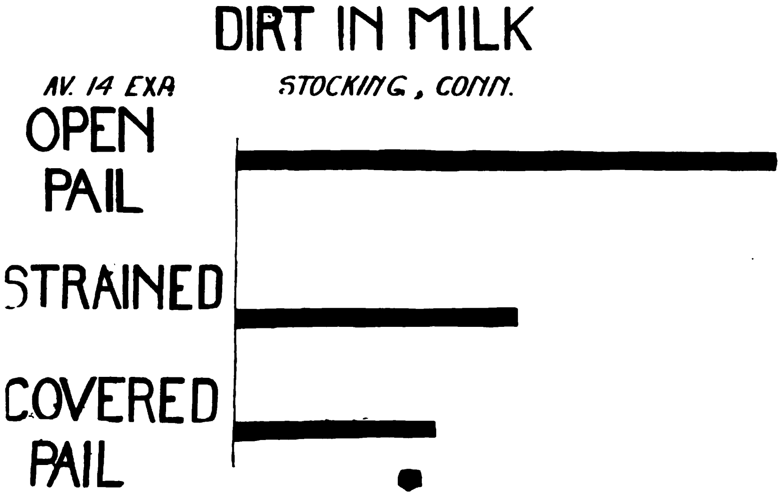

BACTERIA IN MILK BEFORE AND AFTER BRUSHING
NOT BRUSHED
1207 PER C.C.
BRUSHED
2286 PER C.C.
INCREASE
STOCKING CONN.

V.

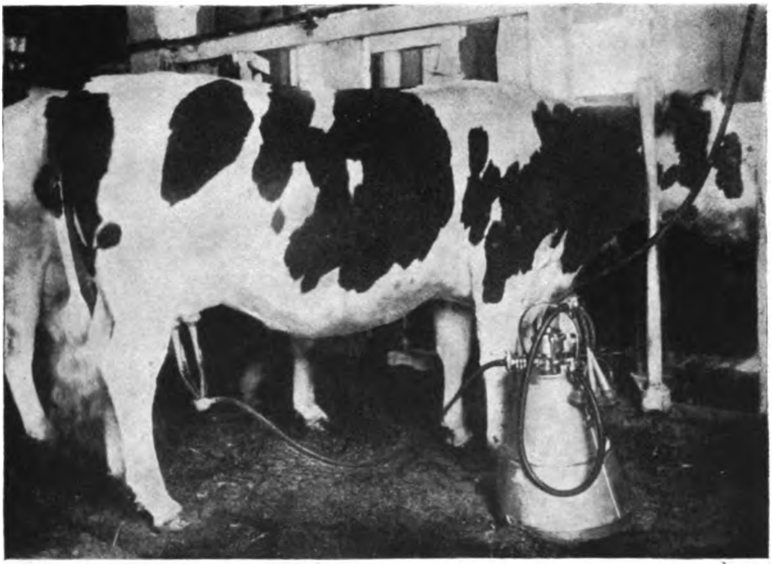


I.

STADTMUELLER
COVERED PAIL.


DIRT IN MILK
AV. 14 EXP.
STOCKING, CONN.
OPEN PAIL
STRAINED
COVERED PAIL

IV



Milking machine (B-L.-K) Milking machines now seem to give promise of practical work and possibility of greater cleanliness.

in by rail. This committee reports also against allowing grocery stores and milk shops to sell milk that has not been delivered to them in original bottles, and not even then unless such dealers provide satisfactory places for holding milk at 50° or lower. The committee consisted of prominent members of the army medical corps; faculty of Georgetown University; Bureau of Animal Industry, and local milk dealers.

Dr. Melvin has recently recommended that city milk should be divided into three commercial classes, and sold as such, as follows:

CLASS 1. *Certified milk,* which must be produced and kept under certain specified conditions, including tuberculin test and veterinary examination of cows, and must answer to certain specifications concerning a low bacteria content not exceeding 10,000. These dairies and their products are subjected to frequent inspection, the milk to be certified to by the Health Officer of the District of Columbia. Such milk would presumably be prescribed by physicians for infants and invalids.

CLASS 2. *Inspected milk* was also to be produced and kept under certain specified conditions, including tuberculin test, veterinary examination of cows, and a bacteria content not exceeding 100,000 per c.c.

CLASS 3. *Pasteurized milk.* All milk from dairies not able to comply with the specifications for classes 1 and 2 was to be pasteurized, sold as pasteurized milk, and kept under specified conditions before and after pasteurization. Cows producing this milk must be examined by a veterinarian, and any cow affected with a disease communicable to the human, or otherwise unfit for milk production, is excluded from the dairy where class 3 milk is produced. Cows showing symptoms of tuberculosis would be barred; cows responding to a tuberculin test but not showing physical symptoms would be allowed to remain in the dairy and supply milk for this class. It is proposed that class 3 milk is to be pasteurized at a central plant under official inspection.

There can now be no question but that Dr. Melvin is correct in the general proposition that milk for public consumption should come from tuberculin-tested cows or else be pasteurized. This plan in honest operation would unquestionably effect great improvement.

There should be requirement that stables and yard of any licensed dairy should be kept in good condition, and that all reasonable precautions for obtaining clean milk be observed at milking time. Cattle giving milk for public or other food supply purpose, must be in so far as can be detected, in normal health and free from disease which can injure human health, or the health of domestic animals.

Present methods of city milk inspection are perhaps a very decided improvement over the older plan of no inspection at all, and possibly progress has been made as rapidly as could be reasonably expected, and yet those who are familiar with this general question must concede that the present situation is unsatisfactory and not creditible to modern sanitation.

This paper is already long, and I cannot undertake to propose a revised system of milk inspection. Such a proposition in detail would have no legitimate place perhaps in this paper; but permit me to offer a sort of preliminary suggestion to the effect that the granting and maintenance of license should depend very much more upon laboratory examinations than at present.

These would cover not only butter fat by Babcock test, chemical examination for preservatives, specific gravity test, etc., as now done, but in addition would also include such of the following as experience might justify: bacteria count; microscopic examination for leucocytes and fibrin; curd test, and perhaps chemical examination by some of the delicate bile reactions for evidences of fecal contamination and similar impurities; and centrifuging, with microscopic and inoculation test of sediment.

In other words, I would put up certain laboratory specifications to which milk must answer, and after reasonable warnings in case of failure would revoke license. The man who could not produce milk answering to the laboratory requirements would be barred, and then our city health departments would be getting at this thing right end first, as the small boy would say. This does not imply that the veterinary inspector is to be ignored or in any way lessened. He should do the same work that he is doing now but more carefully and thoroughly, and the laboratory man should do much more than he is doing and better work. This proposition would imply that all our large and many of the smaller cities should maintain laboratories equipped for bacteriological, chemical, and microscopical work with milk and perhaps other things as well.

Difficulties Encountered.—Minneapolis was one of the first cities in the United States, if not the first city to adopt a tuberculin-test ordinance, and St. Paul was very early in the list, so that we have had opportunity to study this work in Minnesota for a number of years. A number of difficulties have appeared, and some phases of the work are still far from satisfactory.

There has been difficulty in securing disinfection of stables after tuberculous cattle were removed. It has been very difficult to impress dairymen with the importance of refilling their stables with tuberculin-tested cattle. Our city health departments have been more or less hampered by inefficiency because employees have been in some cases political appointees, rather than men selected on account of fitness. There has been of course the usual difficulty of securing sufficient funds for sanitary work. It has not been possible to retest herds frequently enough to secure the best results. Difficulties have been discovered in the way of permanently marketing "tested" and "condemned" or "passed" cattle so as to avoid fraud.

With the State paying three-fourths of the loss to the owner; *i.e.*, three-fourths of the difference between the appraisal and carcass value, the Live Stock Sanitary Board is spending large sums of money. It has often caused the writer, as a member of that Board and responsible for the use of public funds, some uneasiness, and caused him to wonder whether the expense was justified by results.

There has been great difficulty for those managing city work to have milk from tested cows only. Mr. A has his herd tested, cows react and are taken to South St. Paul for slaughter. He replaces these with other cows which as a rule have not been tested, and these give milk for the public until the next test, which may be months or a year later. However, our Sanitary Board has during the past year kept a veterinarian at South St. Paul partly for this purpose, and our city dairyman may now buy tested cows.

On the other side of the question, there is satisfaction in the thought that a very large number of tuberculous cows have been killed, some of which must otherwise have been infecting people and spreading disease among cattle.

The question as to whether human and bovine tuberculosis are identical and intertransmissible need not concern us seriously in this discussion. Both parties to the controversy now agree, and this is the kernel of the whole matter—that man is susceptible to tubercle bacilli of either human or bovine origin, and that those from the bovine are distinctly more virulent. The situation becomes serious for the consumer whether Dr. Koch was right or wrong concerning the point of identity.

SUGGESTIONS.

Milk must not only be clean and kept in clean vessels, but it must also be cooled promptly to check multiplication of bacteria, and must reach the consumer in the shortest possible time.

Those who are especially interested in this subject will find some very interesting reading in Vaugn and Novy's "Ptomains and Leucomains." In one instance there cited, fifty-four persons were made seriously sick after drinking milk. Study was made of the conditions under which this milk was produced and delivered. The cows were in good health and well fed, but were milked at unusual hours, at midnight and at noon. Noon milking alone caused the trouble. This milk was poured while warm into cans and was then, without cooling, hauled eight miles during the warmest part of the day and in the hottest month of the year to the city dealer.

Such cases of poisonous milk are usually associated with undesirable methods of handling, and either filth has carried the poison-producing bacteria or they have gotten into the milk in less objectionable ways, and have there developed under conditions to which milk should never be subjected.

Persons affected with any contagious disease should not handle milk vessels or milk intended for human consumption. Authorities differ on many points; for example, as to whether milk from the depths of a normal udder is germ free, they differ as to whether the bacterial count tallies with the amount of dirt; they differ on the significance of the number of bacteria per cubic centimetre; but they all agree on the fundamental importance of health and cleanliness for the cow; cleanliness for the milk; for utensils; freedom from dust and air currents in the stable; prompt cooling; and, quick marketing.

Expensive dairy plants are not necessary for the production of clean milk or for high dairy efficiency. It is important to realize that clean milk has wonderful keeping qualities,—keeps wonderfully well if it is properly handled and clean enough. Promptly cooled and properly handled milk that changes rapidly is dirty milk.

At the National Dairy Show held in Chicago February, 1906, milk was inspected under three classes,—certified milk, market milk, and cream. This milk was produced February 12, packed in ice, and scored on February 15. The showing was as follows:

Bacteria.	Milk kept sweet (cold).
Certified milk, 0 to 51,000 per c.c.	After 5 weeks
Market milk, 400 to 21,000,000 per c.c.	1 week 50 F.
Cream, 0 to 2,810,000 per c.c.	7 weeks

Think of it, normal sweet after five weeks, and kept so by nothing more than cold and its own cleanliness. Most people living in cities and purchasing milk have considerable difficulty to keep it sweet for twenty-four hours, and often it sours in twelve hours when kept in a refrigerator. Mr. Gurler had milk on exhibition at Paris sent from this country. His milk kept sweet long enough for this purpose, merely because it was clean and cold.

The milk winning gold medal in the market class at the National Dairy Show was produced in a barn which was well lighted and ventilated, and had cement floors. The walls and ceiling were kept whitewashed, and the manure was hauled directly to the field. Special care was taken to avoid dust in the stable during the time of milking and the cows were kept clean. Surely there was nothing fanciful or very difficult, or prohibitive about this for any city dairy.

We need to realize that good, clean, normal milk is the most important single article of diet in the whole list, practically indispensible.

We need to realize also that milk may appear clean and be very dirty, and to realize that milk may be mechanically clean. and bacterially very dirty, and that dirty milk is unsafe milk.

May I not close by reminding myself and my hearers that man is still his brother's keeper just as much now as in the day when Cain heard his Maker's voice asking for the brother. As veterinarians and citizens, we cannot escape our responsibility, and surely we don't wish to shirk it. Let us talk, and teach, and advise; let us consider these matters in medical association meetings, in veterinary association meetings, and in civic leagues. Let us do it in an intelligent, conservative and persistent way, realizing all the time that changes particularly in such work must come very slowly.

"Let us learn to labor and to wait."

MUNICIPAL MILK INSPECTION IN THE SOUTH.

By C. A. CARY and WARD GILTNER,
Auburn, Ala.

Milk is the most universal food product; it has no substitute and there is no prospect that a substitute will be produced in our day. Every attempted substitution requires a greater or less amount of milk in its manufacture. At present milk is nearly as essential to the perpetuation of all the mammalian species as a parentage. Milk is the only food that is safe for the infant and the invalid. It is an essential part of the diet of all classes, at all ages, in one form or another. Without attempting to demonstrate that milk and its products could be used to a greater extent, profitably both to the purse and to the health, it is enough to say that the consumption of milk is so universal that there is or should be a universal interest in the purity of the product. Milk is a most excellent medium for the growth and multiplication of bacteria, both saprophytic and parasitic. There is undoubtedly evidence that milk is frequently a carrier of such disease germs as cause tuberculosis, typhoid, diphtheria, scarlet fever, Asiatic cholera, cholera infantum, and other infantile intestinal diseases, in addition to certain chemical toxic substances frequently causing ptomaine poisoning.

One would hesitate to drink water or eat food contaminated by cow dung or cow hairs, or which had come in contact with the soiled hands of a farm laborer, but we have no hesitancy in consuming millions of gallons of milk thus contaminated. Any one who has had any experience with the dairy business knows that it is a problem to secure milk from a cow's udder and deliver it to the consumer in a distant city without any contamination. The problem of sanitary milk production varies in different climates and is influenced by a great many factors difficult to control. If we exclude any arguments of a purely artistic nature and the influence of food and other environmental factors having no definitely proven deleterious effect on milk production, sanitary milk production resolves itself into a question of controlling the bacterial content of milk. Within recent years governmental inspection of food products, public utilities, and institutions generally in which the public are interested, has become a necessity. A private individual is unable to determine by a casual examination whether the milk supplied his family or his boarding place is a fit article of food unless it bears the guarantee of scientific inspection. Admitting that a proper inspection will solve the question of a sanitary milk supply, the question arises, to whom shall the inspection be entrusted? While the problem is of vital interest to all of us as food consumers, the answering of the question is of interest to us as professional men. We wish to show that only the properly trained veterinarian can ever fill the position of municipal inspector, just as the Federal government believes that the interstate and international meat inspection be placed only in the hands of the qualified veterinarian. Not all veterinarians could make successful milk inspectors, but the requisites for the milk inspector of the highest type are possessed by veterinarians and our veterinary educators should bear this in mind.

As stated above the milk problem consists in controlling the bacterial content. The South naturally presents the greatest difficulties from one viewpoint, viz., the favorable temperature for bacterial growth and ignorance on the part of dairymen and the milkers. In the South, and in most tropical and subtropical climates, milk is consumed while it is yet warm and supposedly fresh. In short, it is never cooled. In Havana we have seen the customer enter the cow stable located on the principal street and receive milk fresh from the cow at mid-day, the milker drawing the milk with one hand and holding the cup or small vessel in the other. The milk is also kept hot at eating houses and served hot along with tea and coffee. We are informed by a native of British India that the milk is always consumed fresh. In England and the colder States in this country it is customary to cool the milk immediately after milking and use it while cold. In continental Europe milk is generally boiled before using. It is customary in the South to observe inconvenient barns just because of this practice of delivering warm fresh milk. For instance, milk sold in the morning is milked shortly after midnight, and that sold in the evening is drawn after noon. There can be no hope of a natural production of ice anywhere in the South, but artificial ice is becoming cheaper, and even in the North one has seen an ice plant erected in one of the coldest cities that is abundantly supplied with water available for ice production. A good supply of cold water, and in many places cold springs can be found in most places in the South and during the winter months the temperature is frequently below 50° F., at which temperature bacterial growth nearly ceases in milk.

We can hope to present nothing new in an article of this nature. It is sufficient to keep up the agitation that is so prevalent that the newspapers and all classes of periodicals, both lay and professional, are agitating the matter. Our interest as veterinarians is greatest because it is to us that the task should fall whenever inspection is introduced into a municipality. We make this stand not with the intention of "getting trade," so to speak, for it is a too well known fact that competent veterinarians are more in demand than men of any profession. The trouble with us to-day is not that we are ignorant of what to do when endeavoring to solve the milk question. Our knowledge of the conditions as they exist and the remedy is greater than our desire or ability to put such knowledge into practice. This is equally true in the sanitary problem. We have to take it into consideration in addition to our relation to the problem, the attitude of the producer toward changes in his time-honored or dishonored dairy practices and that of the consumer may face a seemingly financial crisis when asked to pay a decent price for a real article. It is a fact that many will willingly pay five cents for a lacteal or aquo-lacteal suspension of solution of cow dung, hair, filth and bacteria that kills from 15 per cent. to 25 per cent. of their infants and is greatly lacking in the nutriment generally attributed to milk, when, for 6 or 7 cents they could buy real milk with opposite results. So far as the producer and consumer are concerned it is a matter of education, a process of education in which we must assist and direct them. The report of the milk conference appointed by the commissioners of the District of Columbia to deliberate with respect to the milk supply of the District contains a thorough account of the needs and the remedy. The regulations set down in this report cover the ground admirably. We call attention to one in particular which recommends that half the number of inspectors be veterinary surgeons and the salaries range from $1600 to $2000. We commend this action heartily and believe that it strengthens our position in regard to the selection of veterinarians as milk inspectors; since the conference was composed of men of various professions and included producers and consumers. Their findings are the result of impartial reflection and mature judgment.

Some of the largest cities of the North present a problem that we do not have to solve in the South. In a few isolated cases cream is shipped for a hundred miles or more to some of our large southern cities, but shipping milk for such distances as is necessary to supply New York, Boston or Philadelphia is unheard of. If this ever becomes necessary our ability to produce ice at a reasonable price and the ideal natural conditions under which cows may be kept in the South will make the problem not impossible of solution. There is a great tendency in southern cities to keep cows within or near the city limits and under confinement, feeding on commercial feed stuffs. The reason for this method is that it enables the producer to get his product to the consumer in the shortest period of time. This is a deplorable practice. The cows are kept under unnatural conditions usually associated with undesirable food and uncleanly surroundings and too often contaminated water supply. At a dairy farm located in the country in the South ideal conditions can be produced. There the cows are kept the year round without soiling their udders and with a natural supply of milk-producing food. The common practice of keeping the family cow is all too prevalent in southern cities of considerable size and the usual thing in the smaller cities. It is explained by the fact that there is a demand for milk, and pure milk at that. Many southern men and women who hesitate to do other manual labor, prefer to milk their own cow to entrusting the operation to the negro. These people would generally be willing to pay 10 or 12 cents per quart for milk if assured of its high quality and the necessity of keeping the cow.

Milk production in the South is not attended with great difficulties. Were it not for the instability of a cow's very existence due to the severe ravages of the *Pyroplasma bigeminum* and its carrier, the *Boöphilus annulatus,* the production of milk would be a comparatively pleasant task. Tuberculosis has not invaded the South very extensively except among the negroes in general and in cattle in a few centres; probably for the reason that cattle are not introduced into the South without great danger. Moreover, the outdoor life of the cattle militates against tuberculosis. However, we have found tuberculosis in some of the larger dairies supplying milk to more than one city. The tuberculin test is being used quite extensively to good advantage. It is in connection with cattle diseases that may affect the quality of the milk that the best training possible is demanded in the veterinarian. Anthrax is said to be prevalent in certain sections. We have encountered rabies, charbon, actinomycosis, mycotic stomatitis and cow-pox in cattle and have been frequently called upon to make investigations in udder troubles. Abnormal conditions in milk independent of the health of the cow come to our notice quite often. We have found bloody milk and the sweet-curdling of milk seems to be common. Recently a case of ropy milk was investigated. It came from a single pan out of the mixed milk of a small dairy. The condition developed within twelve hours after milking. A platinum loop inserted into the cream would draw out the cream in threads several inches long. A bacteriological examination showed a pure culture of an organism resembling *Bacterium Lactis cloacæ* (Conn).

In a large dairy herd three cases of streptococcic mastitis were found, streptococci being demonstrated in pure culture in one case for a period of five months. There were undoubtedly other cases of the same trouble in the herd, and there is every reason to believe that a large quantity of pus was sold to the unsuspecting public. Experiments were tried to demonstrate the danger from use of pus, but only negative results were obtained. A guinea pig fed the pus remained well. Inoculations of pure cultures of the streptococcus and also of the pus gave negative results. A kitten recently weaned was fed large quantities of the pus in milk for two weeks without any untoward effects. A calf was born to the cow giving the affected milk without producing any mammary changes. This milk was the same the day before as the day after calving. This calf was allowed to suckle for a week and then another young calf was given the milk for over a month without producing any bad effects in either. While these experiments show nothing positive, they certainly cannot be construed to prove that milk containing pus is harmless to the sensitive digestive tract of an infant. We feel assured that nutritive value of such milk is below par, for all the animals fed such milk failed to make gains that could have attended the consumption of normal milk. We believe these cases of mastitis may well be classed as contagious streptococcic mastitis. Experiments with the injection of a saturated solution of boric acid into the affected quarters were not very fruitful. The procedure consisted in milking the quarters as free of milk as possible, then filling it with the solution by gravity. We used a milk tube connected with a glass funnel by a rubber tube three feet long. After filling the quarter the solution was allowed to remain about five minutes, withdrawn, and the quarter filled again and the fluid allowed to remain for several hours. Before injecting the udder the number of pus cells per c.c. would frequently be fifty, to several hundred millions, and the smears made from the pus showed tangled masses of streptococci and polynuclear cells. For several days after the injection the number of pus cells would decrease to a few million or less than a million and the streptococci disappear only to reappear a few days later. In one case the affection travelled from one teat to another until all but one had been affected.

In two cases of a sporadic nature with no determinable provoking cause *Pyogenes aureus* was isolated. In one of these cases *Pyrogenes aureus* was present in pure culture in the diseased quarter and the M. pyogenes albus in pure cultures in the healthy quarters. Within the last few years the study of the sediment in milk has received careful attention. The data recorded seems to indicate that leucocytes are always present in greater or less numbers in all milk. We have some doubt as to the correctness of the diagnosis in some of these cases. The most approved method of determining the number of leucocytes in milk is by the use of the hemacytometer. In order to distinguish between a leucocyte and an epithelial cell or a fragment of an epithelial cell by this method, one must be a skilled histologist and pathologist, and it seems to us that long practice in examining leucocytes in normal blood by the hemacytometer would be essential for a correct determination of what is a leucocyte in milk. In taking samples from the milk bucket or from any source after it is drawn from the udder, it is conceivable how cells of some description might easily be determined in every case. In milking, especially if the udder is not moistened, many million epithelial cells fall from the skin into the milk. The cells are rarely well formed cells but merely dead fragments, and their shape and size may easily cause a careless observer to mistake them for leucocytes. This is true when the examination is made with the hemacytometer. Stained smears examined with a higher objective readily show their character. We have found the best method of examining the sediment is to centrifuge 10 c.c. of the sample for three to five minutes at a high rate of speed, draw off the supernatent fluid and clean out the fluid nearly to the sediment with a swab of cotton. Bearing in mind the technique of blood examination, the logical diluent is Toison's fluid, and this has proven the best adapted for the examination. If methylene blue is used as in the Doane-Buckley method and as used by Ward et. al., the solution should be made isotonic to the milk. In comparative tests using methylene blue and either normal solution or distilled water, the latter was found to cause swelling of the cells while the former revealed them in a more normal shape. We have been unable to demonstrate cells of any description in the milk of several normal cows by drawing the milk directly into test tubes after taking all precautions. In one of these cases milk could be obtained absolutely free of bacteria. In short, test tubes containing 20 c.c. of the milk, allowed to stand for a month in the incubator, showed no visible change, and inoculations made from them made no growth. These facts are significant of what can be done in the South when cattle live next to nature. Before leaving the matter of sediment we wish to suggest a plan to check results and make conclusions more accurate. When examining a sample of milk, centrifuge two tubes of the sample and examine the sediment of one by the hemacytometer and of the other by making smears and staining with alkaline methyline blue. Delafield's hematoxylon has been found admirable for staining the cells in the sediment and differentiates the epithelial cells and leucocytes better than any other stain tried.

These fragmentary observations are indicative of what the milk inspector must deal with. To solve the great problem of a sanitary milk supply it is only necessary for us as veterinarians to fully realize our relation to the situation and see to it that the training received in our veterinary schools equips the graduate to fill the position of municipal inspector as he to-day, and he alone, is permitted to wear the title of Federal Inspector in our great meat inspection system. While every citizen, every sociologist and every physician is agitating the question of a pure milk supply, let the veterinarian come to a realization of the fact that it is up to him to bring about what they all want.

DISCUSSION.

Dr. C. A. Cary: Mr. President, Ladies and Gentlemen: I shall not read all of my paper. It is getting very late. I shall simply try to give you some of our experiences in the South. The paper will be published, I presume, and that will give you the full contents. Our conditions are somewhat different, as you know, in the matter of temperature, and I want to say to you that in the government of municipal milk inspection of our state we have been compelled to employ graduates of agricultural colleges instead of veterinarians for various reasons; among which was the fact that the graduates of agricultural colleges were better qualified in some respects to handle milk in the cities of the South than the veterinarians who come from the North. Now why? Simply because the veterinary colleges did not fit their men for this work. You say to me, did you try it? We did. We tried them on various occasions, and generally the agricultural college men knew more about dairy bacteria and more about the daily routine and work in the dairy, and had more knowledge of animals, and consequently, did better work. You can talk all you want to about laboratory men, and about establishing laboratories. and doing laboratory work, but laboratory work, in my experience, in milk inspection, will not give you good pure milk, without active and efficient field work. With this introduction I will pass over my paper somewhat hurriedly.

Dr. Hughes: Mr. President, Ladies and Gentlemen: I wish I were an expert chemist, bacteriologist, and sanitarian all in one, so that I might deal scientifically with this abstruse subject. Even if I were it is doubtful as to whether I could add much, if anything, as my friend Dr. Reynolds has left little unsaid.

I desire to compliment him on the selection of his subject and the remarkably able manner in which he has presented it, and I am sure that there is no one who heard him but feels that this is a question of extraordinary and vital interest, no matter whether we view milk from an æsthetic standpoint, or as a medium and conveyor of substances known to be positively detrimental to health.

I will confine my observations to facts connected with the handling of milk as a commercial article with the object of marketing it in as pure and wholesome condition as possible, and with this in view, if you will permit, I will describe conditions at present existing in Chicago.

Ten or fifteen years ago if a man went into an ordinary or pretentious restaurant and asked for a glass of milk and on receiving it let it stand for a few minutes, he would find that a sediment of a dark color would quickly settle to the bottom of the glass. This sediment was pure and unadulterated filth, consisting chiefly of cow excrement, hairs, stable dust, epithelial cells, and the miscellaneous dirt that clings to the hands of the milker, whose habits were the reverse of cleanly.

Some years ago I remember having ocular demonstration of conditions under which filthy milk can be produced. I was for an extended period obliged to visit distilleries where thousands of milch cows were herded together in sheds and fed on distillery slop. These cows were owned by numerous milkmen who leased the stall room and slop food from the distillery owners, and who with their cans and wagons appeared morning and evening for the purpose of milking the cows owned by them.

Distillery slop stimulates mammary secretion as well as bowel and kidney excretion. Cattle like it and ingest it in enormous quantities, then lie and sleep in a semi-drunken condition in their own liquid evacuations, while the gutter behind represented a flowing river of filth. The milkers in this instance—scrupulously unclean—gave little thought to washing hands or udders, a scraper being in the majority of cases used to remove the dripping collections, while when any attempt at washing was made, the same pail and water and cloth served for all the animals in a string. One can conceive of the character of milk drawn under such conditions, and not infrequently it was dispensed without going through the formality of passing it through a strainer.

In this case the deficiency in butter fat was certainly compensated for by the preponderance of solids,—such as they were. To-day, fortunately, such a thing does not, or could not, exist, consequently we must admit that there has been a marked improvement in the production and handling of milk.

In the city of Chicago to-day the small milk dealer is being rapidly eliminated, and the milk industry is falling into the hands of great companies who spare no expense to supply an article that is at least clean. With the disappearance of the small milk dealer, the battered milk can, the ramshackle milk wagon, the unclean driver and the leaky ice vat occupying a dark corner in a foul and dirty stable has passed.

Any one who will take the trouble to investigate the present source of the milk supply of Chicago will be well repaid and forced to the conclusion that well-directed efforts are being made to produce and deliver milk that is palatable, wholesome and clean.

In investigating the source one will find that the larger companies receive milk only from selected farms which are visited weekly by competent inspectors in the employ of the companies, and who impose upon the cattle owners rules and restrictions which, if violated, will cause the prompt rejection of their product. They require that the cattle shall be healthy and well nourished; that the fields be kept free from noxious weeds that injuriously affect milk; that ponds and marshes be fenced off; that stables be properly lighted, ventilated, drained and ceiled, and regularly whitewashed; that all excreta be promptly removed and not accumulated within one hundred yards of the stable.

In the case of one of the largest companies a qualified veterinarian and a physician make regular rounds, the one to inspect the cattle and premises the other the milkers, so that no transmissible disease may be conveyed in the milk. The milking is effected either by hand or machinery, the flanks and udder being wiped by a damp cloth prior to the operation. On being drawn the milk is placed in cans and conveyed to a special milk house which is screened to keep out flies, and provided with a vat containing running water in which the cans are immersed and the milk promptly cooled below 58° F., and it is kept at this temperature until shipped. The milk is quickly transferred from the farm to the creamery, the large companies having many of these latter institutions which serve as collecting points. These creameries are in many instances models of architectural beauty, and with their cement walls and iron tiled floors are maintained scrupulously clean. They are ordinarily two or three stories high and are built on a hill side, so that the milk can be unloaded at the top from which it flows to the lower part of the building by gravitation, passing in its downward course through various purifying devices. On being received at the uppermost point of the building, as the lid from each can is removed the odor is observed, and, if found objectionable, it is promptly rejected. That which passes is weighed, and at intervals the Babcock test for butter fat is used. The milk then is poured into two enormous strainers, included one within the other, and having extraordinarily close meshes. At the same time the can from which the milk has been poured is carried to an adjacent compartment, rinsed, then placed over an open steam pipe and thoroughly sterilized before being returned to the owner. Leaving the strainers the milk flows to the floor below where it enters the clarifiers or separators,—machines which separate the cream from the milk, and also all extraneous or foreign materials from both cream and milk. Even from milk extracted and handled with the greatest regard for cleanliness, it is simply marvellous to observe the amount of filth and foreign material which the clarifier removes. The separated cream and milk are again co-mingled and pass into a large tank within which there is an agitator which more perfectly mixes those fluids.

In the case of cream kept separate from the milk and used for domestic purposes, it passes through a pasteurizing machine where its temperature is raised to 160° F. The largest company in our city at present pasteurize all its cream and is contemplating the installation of machinery for the purpose of similarly treating the milk. Our law makers in Illinois have not as yet recognized the necessity of tuberculin testing of cattle from which our milk supply is drawn, so that tuberculous transmission through milk is a constant menace. Leaving the tank alluded to the mixed cream and milk passes through pipes to the bottling machine, and the filled bottles are moved along to the corking machine, these machines being complicated affairs which perform their respective functions admirably. Thus the milk in its entire passage through the creamery is never touched by human hand. The bottles are placed in cases which are filled with chopped ice and are immediately packed in special cars which await at the door and which promptly convey the milk to the city. Everywhere around the creamers the utmost cleanliness and perfect order prevails. The cleansing of the milk bottles and their sterilization in huge steam tanks where they are subjected for two hours to a temperature of 220° F., being a noticeable feature.

The lavish use of chopped ice in the cars and on the city wagons which eventually transmit the milk from the cars to the depot from which the milk is distributed, and also in the small distributing wagons is something worth passing notice. They go further even than that: When they leave a bottle of milk or cream at the rear door of your residence and your servant is not there to receive it, the distributor places a small cake of ice on the top of each bottle. Under the condition of affairs described we have in Chicago, in my opinion, a milk supply that from a standpoint of cleanliness and healthfulness is above the average.

During the year we have had two outbreaks of scarlet fever, and an endeavor was made to connect the first with an outbreak that occurred at the same time at Genoa Junction, one of the sources from which the milk supply of Chicago is drawn. An exhaustive investigation failed to establish the connection. The second outbreak in the city started at a point far distant from the first, and its origin could not be traced.

Events indicate that in the very near future all the cattle from which we draw our milk supply will be tuberculin tested.

Gentlemen, in conclusion, I wish to emphasize the sentiments expressed by Dr. Cary. I was much impressed with his speech regarding the necessity of veterinarians equipping themselves so as to fill positions as Meat and Milk Inspectors. They should be in possession of the requisite knowledge to qualify them for this particular work. The time is near at hand when there will be an extensive demand made upon our profession for men versed in sanitary medicine. As it is now the tendency is for the medical profession to take to itself a function that rightfully belongs to us.

Dr. Tait Butler: Mr. President, I do not want to take up very much of your time, but there are a few remarks that I would like to make upon this subject. I am very much interested in this subject, and have been for a good while.

I particularly agree with what has been said about the necessity of equipping ourselves for this work, and I want to say right here that the veterinarian knows enough already so far as strictly veterinary knowledge is concerned; so far as the diseases of the cow are concerned, but he is not a dairyman, and until he becomes a dairyman he will not be an efficient dairy inspector. It is a well-known fact that in the vast majority of cases milk when it comes from the udder is wholesome, and that it only becomes unwholesome in consequence of the exposure and improper handling which it receives afterwards. The amount of bad milk that was bad when it came from the udder is very small. The contamination occurs afterwards in the handling of the milk, very largely. Now, then, because the veterinarian is not usually a dairyman, that is, because he does not usually know the details of management which will prevent this contamination, he is not fitted to be a milk inspector. I wish to endorse, so far as my experience has given me any knowledge of the matter, what has been said of the absolute necessity of keeping milk wholesome and clean from the time it comes from the udder. I think we have been inclined to over-rate the importance of the laboratory tests, and the work that has been done along the laboratory line. I think that has been carried far enough, or so far as is necessary for milk inspection. I do not say that all that is necessary has been really determined in order to give us effective dairy inspection, but if we had spent the same money in putting practical dairymen in charge of the work, even if they did not know anything about veterinary science,—if we had put in practical dairymen who knew how milk should be handled, we would have gotten much better results. I do not wish to say, however, that we do not need the laboratory man. We do, because he can supply certain tests that are now recognized as necessary, but as dairy inspectors we must be dairymen, and have a practical knowledge of dairying, and of the best methods for handling and keeping milk.

We cannot do it simply as veterinarians. I want to say further that while it may be so in Chicago or some of the large cities, that the small dairy, and the small milk dealer are not things of the past, the vast majority of the thousands and millions of gallons of milk consumed by the babies of this country and the people of this country is put out from the small milk wagon. Why! it is even yet bottled in the streets.

I am not going to take up any more of your time, but I do want to say that before we can hope to be sanitary inspectors, or before we can hope to be milk inspectors, we have got to be dairymen in the full sense of the word; at least, we must know every detail of dairy practice. I say again that I regard that as of infinitely more importance in putting upon the market wholesome milk than the possession of knowledge of how to treat the diseases of the cow. I will say, however, that I believe that a dairy inspector should be a veterinarian, if possible, because that knowledge is also essential, for by the possession of such scientific knowledge and training, he would always be able to prevent disease among dairy cows, and prevent its communication to the consumers of milk.

Dr. Quitman: I should like to ask a couple of questions, and before coming to them I have a few remarks to make apropos to what Dr. Hughes has said. Also, I wish to make a statement that I think Dr. Reynolds struck the keynote of the whole situation when he said that the important thing in the milk supply was largely a matter of education rather than coercion. That is my reasoning and my knowledge upon that point. If every state were to pass laws enforcing the tuberculin test of all cattle, and enforce all of the safeguards that have been outlined, and which are carried out by this company, there would be within a short time a very serious milk famine. The dairyman would say that that is too much trouble, that that is too expensive, I cannot afford to carry it out, and he would quit the dairy business and go into some other business, and turn his pastures into farms, raising produce for the city markets or otherwise. The best example that can be shown of the value of education of the dairyman, or of the farmer, is right in connection with this same company that the doctor has referred to, which came to Chicago about sixteen years ago. At that time milk was produced and was sent into the city practically without any inspection. It came from any old place, was shipped in any old kind of a can, and was sold out of any old kind of a wagon. This company started in by not only educating the farmer, but encouraging him to do better. They started in first by paying voluntarily an excess over the regular market rate for good, clean milk, insisting that for this excess the farmer should do certain things. First, that he should ventilate his cow stables, that he should whitewash the walls at least twice a year, and allow an inspection of the premises. And then by a system of education they gradually increased the enforcement of all the various rules of cleanliness, and by the gradual introduction of a pretty nearly perfect system, built up little by little in this manner, they are now getting clean milk. What they are doing to-day, had they attempted to enforce when they first started in, they could not have gotten the milk: that is all there is to it. The whole matter has necessarily got to be one of education upon the part of both the dairyman and the public, the public to appreciate the importance of better milk, and the dairyman to understand the necessity for producing it.

I might say in this connection that this company goes further than has been detailed by Dr. Hughes. Take it in the case of the cars that the milk is transported in, those cars, before the milk is put into them, are thoroughly washed out with a hose, the water being allowed to run into them for a considerable period of time. The boxes that the milk bottles are carried in are washed, and wagons that the milk is transported in are washed, and that brings us back to the dairy again, and the questions that I wish to ask regarding the outbreak of scarlet fever that we had in Chicago last winter, and that again seems to be on the rampage. It was laid to the door of the milk producer. I want to say first that scarlet fever is a peculiar disease. I read a well-authenticated article by a physician practicing in one of the sparsely settled western states in which he cited an instance of a family living twenty miles away from any other human being, and who for a period of six weeks had neither received nor transmitted any mail or merchandise of any character, from any other place, or come in contact with other people. In fact, it was during very inclement weather, so that they were isolated for those six weeks, and yet on being called to this place he found them down with scarlet fever. I just mention that one case; a great many other cases might be cited. That brings me, however, to one of the questions that I wish to put to Dr. Reynolds or Dr. Cary: How are they going to prevent milk from carrying scarlet fever germs when they have never been isolated and cannot be detected by a laboratory test? I might add, right in this connection, that this company that I have already referred to incorporated in their contract that producers should report any contagious diseases which arose in their family, with any of their help, or in the family of the help, and they agreed to pay for the average amount of milk consumed and the milk was to be destroyed. They go so far as that in safeguarding the health of their patrons. Now I would like to know from Dr. Reynolds, or Dr. Cary, how you are going to prevent milk from carying scarlet fever germs or detect the contagion. We can say that it is due to a germ, although it has never been recognized or isolated. How are you going to prevent milk from carrying scarlet fever under those circumstances?

Another question that I wish to put to those gentlemen is whether they as practical dairymen and scientific veterinarians, especially posted on the subject of milk production, agree to the selling and delivering of milk from a herd undergoing the tuberculin test? I would like to hear an answer to those two questions.

Dr. Cary: Mr. President, I would rather some one else would answer the question. So far as using any laboratory methods in determining scarlet fever, none of them would apply, and the only thing is that the milk should be protected from any possible infection. There is no absolute method of protecting it from scarlet fever. We could not, therefore, give any positive method by which we could detect the infection as we do in other disease, because we do not know the specific cause of scarlet fever. I should say, in a general way, to protect the milk as we protect it from other communicable diseases that we know are transmitted by a germ. It would be very essential to keep the milk well covered. But after all, even then, if it has been infected, that milk is scarlet fever milk, and I do not know of any way by which you could tell that it was or not infected with the contagion of scarlet fever, until the disease appears in children. All we can do is to try to keep the communicable diseases quarantined and to take away all possibility of infecting the milk at the place where the quarantined patients are located. Scarlet fever infection cannot be detected in a house, in clothing or in milk, until the disease appears in the human family. Then the source of infection is run down or traced back along the milk line or some other line to the place where it previously appeared in the human family.

Dr. Reynolds: I evidently failed to make myself clear on two points although I tried to say things in plain English. First, as to the significance of bacteria in milk, I will say frankly that I attach some importance to this because a large count, other things being equal, is in a general way a measure of contamination. Second, if there are pathogenic bacteria about the stable, in the manure and dust these will fall into the milk in about the same proportion as the non-pathogenic.

There would be no argument concerning the relative importance of sanitary systems and inspection methods if we rightly understood each other. I call your attention to the fact that I said in connection with laboratory work the plan I had in mind did not in any way lessen the amount of work which the dairy inspector was to do, but rather that he was to do much more and much better work than he is doing now, *and* that the laboratory man should do much more and much better work than he is now doing. I would not lessen the amount or importance of work in any line where it has been demonstrated useful, but I do think that there is much more that should be done. I hope that in the future chemists will be able to say there is a specified amount of soluble manure in milk or that milk is free from such contamination and that they will be able to not only count leukocytes and estimate fibrin, but also tell us their significance. We want work that we can rely upon and analysis that mean something.

I submit that the most competent dairy inspector may go to a stable and tell a producer what he should do; tell him to do things that are absolutely necessary, but this is not effective, unless it is followed up. The inspector goes away. He cannot stay there on guard. That is the trouble with a stable—only inspection system. There is something needed at the other end also, and that something is an efficient laboratory service. The statement which has been made with regard to the situation at Chicago seems to present something rare in our experience. The dairymen we have around St. Paul and Minneapolis would be good boys for awhile, but they would not keep it up unless there was some means of detecting a fall from standard at the other end of the line. I wish to emphasize a point mentioned in my paper, viz.: that we can never have good, clean milk until we are ready to pay for it. If you put up the standard of product that may be sold without giving the dairyman a motive for producing milk which will come up to that standard, we will simply drive the present producers out of the market and there will be none coming in to take their places. If we attempt to put up and enforce a higher standard of quality, we must allow a higher standard of price. I mentioned the fact that I considered a campaign of education as of fundamental importance. It was the same point that Dr. Cary brought out only expressed in another way. Possibly he stated it more clearly than I did.

The questions from Dr. Quitman have already been answered. Dr. Butler recently called my attention to an important item. He says the medical men down his way keep sending their babies away from that climate during hot weather. If they will help teach the public how to have sweet and pure milk in hot weather they will accomplish better results, and do a better work than by sending the children away. The trouble is not because of the climate, but it is because the milk is contaminated, and after contamination, developments are more rapid and serious in hot weather.

DR. QUITMAN: I would like to repeat my question. In the first place, Dr. Cary did not answer regarding tuberculosis, and, in the second place, it is all right to talk about quarantine in the case of a big outbreak, but what I want to know from Dr. Cary, and what I would like Dr. Reynolds to say is if there is any possible way by which they can detect scarlet fever in milk before it has had time to spread all over the city. We will take a case as an example. Here is a dairyman. He has a case of scarlet fever in the family. The windows are open for ventilation, the patient is desquamating, and the wind carries the scales right out into the milk. That dairy continues to ship the milk, and the fact that there is a scarlet fever case in the house is kept quiet. Perhaps it is a light case, as often is the case. Now then you cannot quarantine anything there until perhaps that milk is carried into the city and causes an outbreak of scarlet fever, and then an investigation commences, and perhaps they may trace it to its source. What I want to know is whether there is any safeguard that you can throw around that dairy so that that milk which catches that scarlet fever germ may be identified at its inception before it has had opportunity to spread. I would like Dr. Reynolds to give an opinion on that, and also on the question which I asked with reference to tuberculosis.

DR. REYNOLDS: I think it is safe to say, that there is no practical method known, of detecting scarlet fever infection in milk. The only possible protection that I can see for the public against scarlet fever in milk is what would come from careful work of a dairy inspector. It should be laid down as a principle that no one who handles milk, or works around milk, should be allowed to come in contact with any contagious disease of man. One who is handling milk should never be allowed to wait upon a person affected with scarlet fever.

I think it is safe to say that there is no possible method of detecting scarlet fever infection in milk, and unless it may be prevented in some such way as I have outlined, it cannot be absolutely prevented. Milk that was safe to use before the tuberculin test ought to be safe after test. I do not think it is injured in any way by the test. I do not believe that the milk from any tuberculin reacting cow should be used for food unless it is sterilized or pasturized.

A MEMBER: What, if the febrile reaction is high?

DR. QUITMAN: There is a possibility of that milk going, to a great extent, to consumers before the temperature is taken.

DR. HOSKINS: There is one thing which, to my mind, is of almost equal importance with a thorough system of inspection conducted by state and city boards of health. I realize the importance of a careful inspection in order to obtain a pure milk supply. It will undoubtedly be necessary in the cities to prevent the filling of unclean bottles in order to protect the general health of the community by knowing whether the milk is delivered in clean containers or not. There is a good deal of education that we as veterinarians may do with the producers of milk that I do not think we do enough of. There is, however, another side to this question which is a very important one. It is uniformly true, I think, that milk ranges in price in most of our eastern cities from five to eight cents a quart, and we know that whiskey can be produced which will range from fifty cents to a dollar and a half a quart, according to its standard of purity. We have got to the point when the public must be made to realize that there is or should be a very great difference between a quart of milk costing from five to eight cents and a quart costing from twelve to sixteen cents, and that it cannot expect to pay five or six cents for milk and have thoroughly good milk according to modern standards. If we are going to have a first class milk supply we must expect to pay a higher rate for it, because, as Dr. Reynolds has very well said, the cost of producing milk, and especially high-class milk, has increased very rapidly. We have milk in the city of Philadelphia that for a great many years we have been paying an increased price for to the farmer because of its additional cleanliness, and because he has been following out instructions in regard to the production and care of that milk. Such a milk has been sold for from one to two cents higher than that sold by the other dairymen delivering milk in the city.

Now we have men there who are selling all the milk they can produce at prices as high as sixteen cents a quart, and selling it just as fast as they can multiply production. So we must reach the people, and they must be educated to understand that if they want clean milk that is absolutely wholesome and free from impurities they must be willing to pay for it, and to understand that ten, twelve, fourteen and sixteen cents a quart is not an excessive price for that kind of an article. In addition to that, there must be a campaign of education to teach the people how to care for milk. There is a great deal of negligence indeed in the way milk is cared for after it is delivered at the residence of a consumer. Oftentimes, it is left in places, after having been taken off the ice, where the sun shines upon it, and, of course, changes take place very rapidly. Then it is taken into the house and put into the refrigerator, very frequently emptied into an open vessel where flies and insects have access to it, and, consequently, deteriorates very rapidly. I think that that is a work which is very largely in the line of the veterinarian, and insures the general use of a more wholesome supply of milk all over the land.

THE EFFECT OF THE TUBERCULIN TEST UPON LACTATION.

By S. H. GILLILAND, V.M.D., M.D., and E. L. CORNMAN,
V.M.D.,
Marietta, Pennsylvania.

In compiling this paper the writers had in mind the oft-repeated statement by herd owners and not a few veterinarians that the tuberculin test has much influence upon decreasing the milk yield, and in some sections this argument is used by dairymen when a test is suggested.

Tuberculin is an intra- and extra-cellular product of the bacillus of tuberculosis. The extra-cellular portion is obtained during the growth of the tubercle bacillus upon glycerine, beef broth, while the intra-cellular portion is obtained by maceration and heat.

The tuberculin test after over fifteen years of use has come to be recognized as the only and best means of determining occult or hidden tuberculosis in cattle. Each day sees it grow more in favor as a means of diagnosing tuberculosis in man. In the city of Chicago within the last month Health Commissioner Evans has considered it wise to furnish tuberculin to the physicians of the city to be used as an aid in the early diagnosis of incipient cases in man, in order that the same may receive proper advice and treatment.

The old tuberculin of Koch, which is the one used entirely for diagnostic purposes in cattle, does not contain any of the organisms of tuberculosis, and therefore the statement that it is capable of causing the disease is as impossible as spontaneous generation.

In a review of the literature we find very little information relative to the effect tuberculin has upon the products of the animals tested. A study upon the effect of tuberculin injections upon the milk of healthy and diseased cows was made by Dr. A. E. de Schweinitz[1] in 1896. These experiments pertained in particular to the variation in the amount of fat in the milk before and after the injections of tuberculin. In brief, the experiments showed little or no variation in the amount of fat in the milk of healthy cows, while the milk of reacting cows following the injections of tuberculin showed a decided decrease. The fever may have had some influence upon this decrease in the fat content.

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[1] Tuberculosis Investigations, Bulletin 13, Bureau of Animal Industry, U. S. Department of Agriculture.

Dr. Veranus A. Moore[2] states that in his experience with tuberculin there is a slight falling off in the quantity of milk in reacting animals following the test, which he believes is due to the rise of temperature.

The main object of this paper, and the one in which the dairyman is most interested, is the results upon non-reacting cows, and we have therefore in compiling our table based the figures upon the results of 500 non-reacting animals. In the case of reacting cows the figures are based upon the results of forty-eight animals. We determined the average daily number of pounds of milk the animal gave for the week preceding the test and then for each twenty-four hours following the test for four periods of twenty-four hours each. We also computed the average of these four periods, showing the gain or loss. It occurred to the writers that it would be wise to show the gain or loss for each twenty-four hours following the test in order that we might show just when there was a loss if any. The loss might not have been evident had a week's average been taken.

Owing to the length of the table we will not read the same.

A summary of the non-reacting cows shows the following results:

243 cows, or 48.6 per cent., showed an average gain during the first 24 hours following the test of 1.15 lbs. of milk.
26 cows, or 5.2 per cent., neither gained nor lost during this period.
231 cows, or 46.2 per cent., showed an average loss during the first 24 hours following the test of 1.21 lbs. of milk.
189 cows, or 37.8 per cent., showed an average gain during the second 24 hours following the test of 1.05 lbs. of milk.
14 cows, or 2.8 per cent., neither gained nor lost during this period.
297 cows, or 59.4 per cent., showed an average loss during the second 24 hours following the test of 1.39 lbs. of milk.
193 cows, or 38.6 per cent., showed an average gain during the third 24 hours following the test of 1.15 lbs. of milk.
13 cows, or 2.6 per cent., neither gained nor lost during this period.

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[2] Personal letter.

294 cows, or 58.8 per cent., showed an average loss during the third 24 hours following the test of 1.44 lbs. of milk.
192 cows, or 38.4 per cent., showed an average gain during the fourth 24 hours following the test of 1.13 lbs. of milk.
14 cows, or 2.8 per cent., neither gained nor lost during this period.
294 cows, or 58.8 per cent., showed an average loss during the fourth 24 hours following the test of 1.4 lbs. of milk.
189 cows, or 37.8 per cent., showed an average daily gain for the four days following the test of 1.05 lbs. of milk.
18 cows, or 3.6 per cent., showed neither a daily gain nor loss during this period over their daily average for the week preceding the test.
293 cows, or 58.6 per cent., showed an average daily loss for the four days following the test of 1.23 lbs. of milk.

The annoyance of the injection and the temperature measurements is no doubt responsible for the high number of 58.6 per cent. of *non-reacting* cows which showed a slight loss in milk production following the test.

A summary of the reacting cows shows the following results:

5 cows, or 10.4 per cent., showed an average gain during the first 24 hours following the test of .96 lbs. of milk.
1 cow, or 2.08 per cent., neither gained nor lost during this period.
42 cows, or 87.5 per cent., showed an average loss during the first 24 hours following the test of 2.5 lbs. of milk.
3 cows, or 6.25 per cent., showed an average gain during the second 24 hours following the test of 1.1 lbs. of milk.
45 cows, or 93.7 per cent., showed an average loss during the second 24 hours following the test of 4.36 lbs. of milk.
12 cows, or 25 per cent., showed an average gain during the third 24 hours following the test of 1.25 lbs. of milk.
36 cows, or 75 per cent., showed an average loss during the third 24 hours following the test of 2.53 lbs. of milk.
17 cows, or 35 per cent., showed an average gain during the fourth 24 hours following the test of 2.17 lbs. of milk.
3 cows, or 6.25 per cent., neither gained nor lost during this period.
28 cows, or 58.3 per cent., showed an average loss during the fourth 24 hours following the test of 2.24 lbs. of milk.
7 cows, or 14 per cent., showed an average daily gain for the four days following the test of .62 lbs. of milk.
41 cows, or 85.4 per cent., showed an average daily loss for the four days following the test of 2.46 lbs. of milk.

In closing we wish to acknowledge the assistance given us in compiling the figures by Mr. Carey, of Burnside Farm, and Mr. Barclay, of Soapstone Farm.

TABLE OF NON-REACTING COWS

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
July 22, 1904..........	1	1	24.7	22.2	....	2.5	22.7	....	2.	22.9	....	1.8	23.	....	1.7	22.7	....	2.
July 22, 1904..........	2	2	17.	16.2	....	.8	16.	....	1.	15.6	....	1.4	15.7	....	1.3	15.8	....	1.2
July 22, 1904..........	3	3	19.8	19.	....	.8	18.1	....	1.7	18.	....	1.8	18.2	....	1.6	18.3	....	1.5
July 22, 1904..........	4	4	24.4	24.	....	.4	22.	....	2.4	21.7	....	2.7	23.	....	1.4	22.6	....	1.8
July 22, 1904..........	5	5	20.7	18.6	....	2.1	18.5	....	2.2	19.1	....	1.6	17.5	....	3.2	18.4	....	2.3
July 22, 1904..........	6	6	22.9	24.	1.1	....	21.	....	1.9	22.	....	.9	22.	....	.9	22.2	....	.7
July 22, 1904..........	7	7	32.5	30.6	....	1.9	29.2	....	3.3	29.	....	3.5	28.	....	4.5	29.2	....	3.3
July 22, 1904..........	8	8	32.3	31.	....	1.3	29.	....	3.3	28.	....	4.3	32.2	....	.1	30.	....	2.3
July 22, 1904..........	9	9	26.4	26.6	.2	....	26.	....	.4	25.7	....	.7	26.6	.2	....	26.2	....	.2
July 22, 1904..........	10	10	25.3	23.2	....	2.1	22.	....	3.3	22.6	....	2.7	23.4	....	1.9	22.8	....	2.5
July 22, 1904..........	11	11	29.8	29.	....	.8	28.7	....	1.1	26.	....	3.8	26.5	....	3.3	27.5	....	2.3
July 22, 1904..........	12	12	24.3	23.	....	1.3	22.	....	2.3	22.5	....	1.8	24.	....	.3	22.8	....	1.5
July 22, 1904..........	13	13	28.	26.6	....	1.4	26.5	....	1.5	26.1	....	1.9	27.5	....	.5	26.6	....	1.4
July 22, 1904..........	14	14	18.8	20.	1.2	....	19.5	....	.7	19.	.2	....	20.	1.2	....	19.6	.8	....
July 22, 1904..........	15	15	23.6	22.6	....	1.	22.5	....	1.1	23.5	....	.1	22.	....	1.6	22.6	....	1.
July 22, 1904..........	16	16	16.3	15.5	....	.8	16.	....	.3	15.	....	1.3	16.5	.2	....	15.7	....	.6
July 22, 1904..........	17	17	26.8	24.5	....	2.3	24.	....	2.8	24.7	....	2.1	25.	....	1.8	24.5	....	2.3
July 22, 1904..........	18	18	31.4	32.2	.8	....	29.	....	2.4	31.	....	.4	32.5	1.1	....	31.1	....	.3
July 22, 1904..........	19	19	29.1	35.2	6.1	....	35.5	6.4	....	35.	5.9	....	35.	5.9	....	35.1	6.	....
July 22, 1904..........	20	20	24.7	23.5	....	1.2	22.9	....	1.8	22.7	....	2.	23.2	....	1.5	23.	....	1.7
July 22, 1904..........	21	21	26.2	24.7	....	1.5	23.9	....	2.3	24.	....	2.2	24.4	....	1.8	24.2	....	2.
July 22, 1904..........	22	22	29.6	30.	.4	....	28.7	....	.9	27.9	....	1.7	28.	....	1.6	28.6	....	1.
July 22, 1904..........	23	23	28.9	28.5	....	.4	28.6	....	.3	27.	....	1.9	27.5	....	1.4	27.9	....	1.

July 22, 1904..........	24	24	27.7	24.5	....	3.2	26.	....	1.7	24.6	....	3.1	25.	....	2.7	25.	....	2.7
July 22, 1904..........	25	25	19.5	18.4	....	1.1	15.9	....	3.6	15.6	....	3.9	16.	....	3.5	16.4	....	3.1
July 22, 1904..........	26	26	30.8	28.7	....	2.1	28.2	....	2.6	27.2	....	3.6	28.9	....	1.9	28.2	....	2.6
July 22, 1904..........	27	27	32.7	33.	.3	....	31.7	....	1.	30.5	....	2.2	32.	....	.7	31.8	....	.9
July 22, 1904..........	28	28	35.2	35.	....	.2	33.6	....	1.6	33.5	....	1.7	34.6	....	.6	34.1	....	1.1
July 22, 1904..........	29	29	28.9	29.9	.1	....	29.5	.6	....	28.6	....	.3	29.7	.8	....	29.4	.5	....
July 22, 1904..........	30	30	23.7	24.	.3	....	22.	....	1.7	22.7	....	1.	25.	1.3	....	23.4	....	.3
July 22, 1904..........	31	31	25.1	24.4	....	.7	24.4	....	.7	25.9	.8	....	25.4	.3	....	25.	....	.1
July 22, 1904..........	32	32	35.5	40.	4.5	....	39.	3.5	....	38.2	2.7	....	39.	3.5	....	39.	3.5	....
July 22, 1904..........	33	33	28.9	27.9	....	1.	27.	....	1.9	27.	....	1.9	27.	....	1.9	27.2	....	1.7
July 22, 1904..........	34	34	27.4	27.2	....	.2	26.5	....	.9	25.5	....	1.9	26.	....	1.4	26.3	....	1.1
July 22, 1904..........	35	35	30.6	29.5	....	1.1	29.2	....	1.4	30.7	.1	....	29.6	....	1.	29.7	....	.9
July 22, 1904..........	36	36	29.4	28.4	....	1.	26.1	....	3.3	27.7	....	1.7	27.6	....	1.8	27.4	....	2.
July 22, 1904..........	37	37	33.9	33.5	....	.4	32.	....	1.9	32.2	....	1.7	32.6	....	1.3	32.5	....	1.4
July 22, 1904..........	38	38	30.6	28.6	....	2.	28.2	....	2.4	28.6	....	2.	28.7	....	1.9	28.5	....	2.1
July 22, 1904..........	39	39	32.5	30.	....	2.5	29.9	....	2.6	30.	....	2.5	31.2	....	1.3	30.2	....	2.3
July 22, 1904..........	40	40	25.5	24.	....	1.5	24.4	....	1.1	23.7	....	1.8	25.1	....	.4	24.3	....	1.2
July 22, 1904..........	41	41	22.7	23.	.3	....	22.	....	.7	21.5	....	1.2	23.	.3	....	22.7	....	....
July 22, 1904..........	42	42	33.8	31.2	....	2.6	33.	....	.8	32.	....	1.8	32.6	....	1.2	32.2	....	1.6
July 22, 1904..........	43	43	32.8	32.	....	.8	33.	.2	....	32.	....	.8	30.	....	2.8	31.7	....	1.1
July 22, 1904..........	44	44	21.1	19.5	....	1.6	18.7	....	2.4	18.	....	3.1	18.	....	3.1	18.5	....	2.6
July 22, 1904..........	45	45	26.3	24.	....	2.3	24.	....	2.3	24.	....	2.3	24.5	....	1.8	24.1	....	2.2
July 22, 1904..........	46	46	18.5	17.6	....	.9	17.5	....	1.	18.	....	.5	17.5	....	1.	17.6	....	.9
July 22, 1904..........	47	47	30.4	29.	....	1.4	28.7	....	1.7	28.	....	2.4	28.	....	2.4	28.4	....	2.
July 22, 1904..........	48	48	21.1	21.4	.3	....	19.6	....	1.5	20.5	....	.6	20.6	....	.5	20.5	....	.6
July 22, 1904..........	49	49	23.2	23.5	.3	....	19.5	....	3.7	20.7	....	2.5	22.5	....	.7	21.5	....	1.7
November 30, 1904....	1	50	27.	32.	5.	....	31.9	4.9	....	32.	5.	....	32.4	5.4	....	32.	5.	....
November 30, 1904....	2	51	34.1	33.6	....	.5	34.4	.3	....	34.9	.8	....	34.	....	.1	34.2	.1	....
November 30, 1904....	3	52	20.5	18.3	....	2.2	18.3	....	2.2	17.6	....	2.9	18.7	....	1.8	18.2	....	2.3
November 30, 1904....	4	53	21.6	22.7	1.1	....	23.1	1.5	....	22.4	.8	....	22.3	.7	....	22.6	1.	....
November 30, 1904....	5	54	21.8	21.9	.1	....	23.1	1.3	....	22.1	.3	....	23.	1.2	....	22.5	.7	....
November 30, 1904....	6	55	25.6	25.6	....	....	26.	.4	....	24.7	....	.9	25.3	....	.3	25.4	....	.2
November 30, 1904....	7	56	17.1	16.9	....	.2	16.6	....	.5	16.3	....	.8	16.7	....	.4	16.6	....	.5
November 30, 1904....	8	57	25.1	25.7	.6	....	25.3	.2	....	25.	....	.1	23.9	....	1.2	24.9	....	.2
					22.6	52.1		19.3	84.3		16.6	89.8		14.1	68.1		17.6	72.2

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					22.6	52.1		19.3	84.3		16.6	89.8		14.1	61.8		17.6	72.2
November 30, 1904	9	58	25.6	25.3	....	.3	24.6	....	1.	24.7	....	.9	26.	.4	....	25.1	....	.5
November 30, 1904	10	59	22.8	23.5	.7	....	23.	.2	....	23.	.2	....	23.5	.7	....	23.2	.4	....
November 30, 1904	11	60	20.5	21.	.5	....	20.6	.1	....	20.7	.2	....	20.3	....	.2	20.6	.1	....
November 30, 1904	12	61	16.	15.4	....	.6	15.1	....	.9	14.5	....	1.5	14.5	....	1.5	14.8	....	1.2
November 30, 1904	13	62	21.9	21.7	....	.2	22.4	.5	....	22.	.1	....	22.1	1.1	....	22.	.1	....
November 30, 1904	14	63	24.6	24.6	....	....	24.4	....	.2	24.6	....	....	24.3	....	.3	24.4	....	.2
November 30, 1904	15	64	21.1	22.4	1.3	....	22.6	1.5	....	21.3	.2	....	21.	....	.1	21.8	.7	....
November 30, 1904	16	65	23.7	23.9	.2	....	22.7	....	1.	21.7	....	2.	23.6	....	.1	22.9	....	1.
November 30, 1904	17	66	25.3	23.3	....	2.	24.3	....	1.	23.9	....	1.4	23.7	....	1.6	23.8	.5	....
November 30, 1904	18	67	23.5	23.4	....	.1	23.	....	.5	23.	....	.5	23.	....	.5	23.1	.4	....
November 30, 1904	19	68	23.4	23.9	.5	....	24.1	.7	....	22.5	....	.9	23.	....	.4	23.3	....	.1
November 30, 1904	20	69	20.9	20.6	....	.3	20.3	....	.6	19.9	....	1.	20.	....	.9	20.2	....	.7
November 30, 1904	21	70	20.7	21.4	.7	....	22.	1.3	....	21.3	.6	....	21.	.3	....	21.4	.7	....
November 30, 1904	22	71	27.8	27.6	....	.2	27.5	....	.3	27.	....	.8	26.4	....	1.4	27.1	....	.7
November 30, 1904	23	72	25.9	25.5	....	.4	24.6	....	1.3	25.	....	.9	26.	.1	....	25.2	....	.7
November 30, 1904	24	73	39.8	40.	.2	....	39.1	....	.7	37.6	....	2.2	37.4	....	2.4	38.5	....	1.3
November 30, 1904	25	74	28.4	25.	....	3.4	25.5	....	2.9	24.5	....	3.9	25.6	....	2.8	25.1	....	3.3
November 30, 1904	26	75	24.1	25.6	1.5	....	26.	1.9	....	24.5	.4	....	24.7	.6	....	25.2	1.1	....
November 30, 1904	27	76	26.7	25.	....	1.7	23.6	....	3.1	23.6	....	3.1	22.5	....	4.2	23.6	....	3.1
November 30, 1904	28	77	29.8	27.5	....	2.3	27.5	....	2.3	26.	....	3.8	25.5	....	4.3	26.6	....	3.2
November 30, 1904	29	78	25.7	25.3	....	.4	25.1	....	.6	25.	....	.7	25.1	....	.6	25.1	....	.6
November 30, 1904	30	79	28.1	26.5	....	1.6	27.3	....	.8	26.	....	2.1	26.	....	2.1	26.4	....	.1

November 30, 1904	31	80	24.1	25.4	1.3	....	25.4	1.3	....	26.3	2.2	....	25.5	1.4	....	25.6	1.5	....
November 30, 1904	32	81	26.7	24.7	....	2.	23.9	....	2.8	23.7	....	3.	23.3	....	3.4	23.9	....	2.8
November 30, 1904	33	82	21.4	21.3	....	.1	21.	....	.4	22.1	.7	....	21.6	.2	....	21.5	.1	....
November 30, 1904	34	83	20.6	20.	....	.6	20.5	....	.1	20.3	....	.3	20.3	....	.3	20.2	....	.4
June 13, 1905..........	1	84	17.9	17.	....	.9	16.2	....	1.7	16.6	....	1.3	17.6	....	.3	16.8	....	1.1
June 13, 1905..........	2	85	18.8	19.	.2	....	18.5	....	.3	19.2	.4	....	18.	....	.8	18.6	....	.2
June 13, 1905..........	3	86	34.2	34.5	.3	....	31.5	....	2.7	30.2	....	4.	32.5	....	1.7	32.1	....	2.1
June 13, 1905..........	4	87	18.6	18.	....	.6	16.3	....	2.3	16.5	....	2.1	17.5	....	1.1	17.	....	1.6
June 13, 1905..........	5	88	22.	23.	1.	....	20.1	....	1.9	22.9	.9	....	21.7	....	.3	21.9	....	.1
June 13, 1905..........	6	89	20.	20.	....	....	20.0	....	....	20.2	.2	....	19.	....	1.	19.8	....	.2
June 13, 1905..........	7	90	7.9	6.	....	1.9	6.	....	1.9	6.5	....	1.4	5.3	....	2.6	5.9	....	2.
June 13, 1905..........	8	91	22.2	21.	....	1.2	20.	....	2.2	20.7	....	1.5	19.	....	3.2	20.1	....	2.1
June 13, 1905..........	9	92	31.8	31.2	....	.6	31.	....	.8	30.5	....	1.3	34.2	2.4	....	31.7	....	.1
June 13, 1905..........	10	93	22.4	24.3	1.9	....	22.4	....	....	22.5	.1	....	22.5	.1	....	22.9	.5	....
June 13, 1905..........	11	94	25.	22.5	....	2.5	26.	1.	....	28.	3.	....	27.5	2.5	....	26.	1.	....
June 13, 1905..........	12	95	45.3	35.	....	10.3	38.5	....	6.8	43.2	....	2.1	42.	....	3.3	39.6	....	5.7
June 13, 1905..........	13	96	39.	39.	....	....	38.4	....	.6	38.5	....	.5	36.5	....	2.5	38.1	....	.9
June 13, 1905..........	14	97	23.1	22.7	....	.4	21.1	....	2.	23.1	....	....	23.7	.6	....	22.6	....	.5
June 13, 1905..........	15	98	13.5	13.7	.2	....	13.6	.1	....	13.2	....	.3	12.6	....	.9	13.2	....	.3
June 13, 1905..........	16	99	23.6	22.4	....	1.2	22.6	....	1.	23.	....	.6	24.6	1.	....	23.1	....	.5
June 13, 1905..........	17	100	26.1	24.9	....	1.2	23.2	....	2.9	22.5	....	3.6	23.6	....	2.5	23.5	....	2.6
June 13, 1905..........	18	101	31.4	28.5	....	2.9	27.7	....	3.7	27.2	....	4.2	28.	....	3.4	27.8	....	3.6
June 13, 1905..........	19	102	19.1	19.2	.1	....	19.6	.5	....	19.7	.6	....	19.	....	.1	19.3	.2	....
June 13, 1905..........	20	103	35.6	36.	.4	....	37.	1.4	....	37.	1.4	....	38.2	2.6	....	37.	1.4	....
June 13, 1905..........	21	104	34.8	33.5	....	1.3	34.5	....	.3	35.5	.7	....	29.5	....	5.3	33.2	....	1.6
June 13, 1905..........	22	105	37.6	34.1	....	3.5	34.1	....	3.5	38.	.4	....	35.	....	2.6	35.3	....	2.3
June 13, 1905..........	23	106	26.1	26.5	.4	....	25.6	....	.5	24.5	....	1.6	24.2	....	1.9	25.2	....	.9
June 13, 1905..........	24	107	32.7	28.1	....	4.6	29.	....	3.7	28.5	....	4.2	29.2	....	3.5	28.7	....	4.
June 13, 1905..........	25	108	32.8	33.	.2	....	32.5	....	.3	32.2	....	.6	32.5	....	.3	32.5	....	.3
June 13, 1905..........	26	109	22.1	20.2	....	1.9	19.7	....	2.4	19.5	....	2.6	21.	....	1.1	20.1	....	2.
June 13, 1905..........	27	110	33.1	33.7	.6	....	32.2	.1	....	34.5	1.4	....	33.	.1	....	33.6	.5	....
June 13, 1905..........	28	111	35.2	36.2	1.	....	35.6	.4	....	34.7	....	.5	33.5	....	1.7	35.	....	.2
June 13, 1905..........	29	112	27.2	26.5	....	.7	27.7	.5	....	26.6	....	.6	27.4	.2	....	27.	....	.2
June 13, 1905..........	30	113	15.9	15.4	....	.5	16.7	.8	....	17.	1.1	....	15.6	....	.3	16.1	.2	....
					35.8	108.5		31.6	147.1		99.1	152.8		28.4	129.2		27.0	127.2

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					35.8	108.5		31.6	147.1		99.1	152.8		28.4	129.2		27.0	127.2
June 13, 1905..........	31	114	34.8	36.2	1.4	....	35.5	....	.3	34.6	....	.2	34.	....	.8	34.8	....	....
June 13, 1905..........	32	115	22.1	22.	....	.1	22.5	.4	....	26.4	4.3	....	18.5	....	3.6	22.3	.2	....
June 13, 1905..........	33	116	40.7	40.1	....	.6	39.	....	1.7	39.5	....	1.2	37.7	....	3.	39.	....	1.7
June 13, 1905..........	34	117	47.1	48.2	1.1	....	47.	....	.1	44.6	....	2.5	44.2	....	2.9	46.	....	1.1
June 13, 1905..........	35	118	26.8	27.4	.6	....	25.4	....	1.4	27.5	.7	....	27.3	.5	....	26.9	.1	....
June 13, 1905..........	36	119	23.4	21.	....	2.4	21.5	....	1.9	21.3	....	2.1	21.7	....	1.7	21.3	....	2.1
June 13, 1905..........	37	120	38.5	39.9	1.4	....	37.1	....	1.4	37.	....	1.5	39.	.5	....	38.2	....	.3
June 13, 1905..........	38	121	39.4	41.9	2.5	....	40.	.6	....	40.7	1.3	....	40.3	.9	....	40.7	1.3	....
June 13, 1905..........	39	122	24.8	19.5	....	5.3	19.	....	5.8	22.4	....	2.4	20.1	....	4.7	20.2	....	4.6
June 13, 1905..........	40	123	21.	19.5	....	1.5	19.	....	2.	20.	....	1.	19.	....	2.	19.3	....	1.7
June 13, 1905..........	41	124	31.8	32.4	1.4	....	31.	....	.8	31.9	.1	....	31.3	....	.5	31.4	....	.4
June 13, 1905..........	42	125	25.8	26.5	.7	....	25.	....	.8	25.	....	.8	25.7	....	.1	25.5	....	.3
June 13, 1905..........	43	126	22.8	24.7	1.9	....	24.	1.2	....	24.	1.2	....	24.	1.2	....	24.1	1.3	....
June 13, 1905..........	44	127	25.4	26.3	.9	....	24.	....	1.4	23.6	....	1.8	22.	....	3.4	23.9	....	1.5
June 13, 1905..........	45	128	18.6	20	1.4	....	19.	.4	....	20.	1.4	....	19.6	1.	....	19.6	1.	....
June 13, 1905..........	46	129	29.8	28.4	....	1.4	26.9	....	2.9	27.	....	2.8	27.6	....	2.2	27.4	....	2.4
June 13, 1905..........	47	130	32.2	32.6	.4	....	33.	.8	....	33.	.8	....	33.7	1.5	....	33.	.8	....
June 13, 1905..........	48	131	18.7	17.	....	1.7	17.	....	1.7	16.2	....	2.5	17.	....	1.7	16.8	....	1.9
June 13, 1905..........	49	132	26.7	24.	....	2.7	24.1	....	2.6	25.	....	1.7	25.9	....	.8	24.7	....	2.
June 13, 1905..........	50	133	26.	25.2	....	.8	25.2	....	.8	24.	....	2.	25.2	....	.8	24.9	....	1.1
June 13, 1905..........	51	134	14.5	12.	....	2.5	12.5	....	2.	13.5	....	1.	13.5	....	1.	12.8	....	1.7
June 13, 1905..........	52	135	21.	21.	....	....	19.6	....	1.4	20.5	....	.5	20.5	....	.5	20.4	....	.6

June 13, 1905	53	136	25.7	27.	1.3	....	26.9	1.2	....	26.	.3	....	27.1	1.4	....	26.7	1.	....
June 13, 1905	54	137	18.5	19.	.5	....	18.6	.1	....	19.	.4	....	18.9	.4	....	18.8	.3	....
June 13, 1905	55	138	28.9	29.	.1	....	27.6	....	1.3	28.3	....	.6	28.	....	.9	28.3	....	.7
June 13, 1905	56	139	22.7	22.	....	.7	21.5	....	1.2	22.	....	.7	21.8	....	.9	21.8	....	.9
June 13, 1905	57	140	16.	16.1	.1	....	15.4	....	.6	16.6	.6	....	17.5	1.5	....	16.4	.4	....
October 24, 1905	1	141	13.	14.5	1.5	....	14.5	1.5	....	13.3	.3	....	12.7	....	.3	13.7	.7	....
October 24, 1905	2	142	26.9	27.6	.7	....	27.	.1	....	27.	.1	....	26.6	....	.3	27.	.1	....
October 24, 1905	3	143	23.1	23.5	.4	....	23.	.1	....	22.8	....	.3	22.8	....	.3	23.	.1	....
October 24, 1905	4	144	13.5	12.6	....	.9	11.3	....	2.2	11.	....	2.5	11.3	....	2.2	11.5	2.	....
October 24, 1905	5	145	30.	30.5	.5	....	31.	1.	....	30.3	.3	....	28.	....	2.	29.9	....	.1
October 24, 1905	6	146	34.2	35.5	1.3	....	34.	....	.2	34.5	.3	....	33.	....	1.2	34.2	....	....
October 24, 1905	7	147	42.4	44.	1.6	....	42.7	.3	....	43.7	1.3	....	44.	1.6	....	43.6	1.2	....
October 24, 1905	8	148	24.	23.7	....	.3	23.3	....	.7	23.7	....	.3	23.3	....	.7	23.5	....	.5
October 24, 1905	9	149	40.3	42.5	2.2	....	41.5	.8	....	41.	.7	....	42.5	2.2	....	41.8	1.5	....
October 24, 1905	10	150	36.2	36.5	.3	....	36.	....	.2	38.	1.8	....	37.	.8	....	36.8	.6	....
October 24, 1905	11	151	24.6	25.5	.9	....	25.	.4	....	26.	1.6	....	25.5	.9	....	25.5	.9	....
October 24, 1905	12	152	13.6	13.	....	.6	12.5	....	1.1	12.3	....	1.3	12.5	....	1.1	12.5	....	1.1
October 24, 1905	13	153	21.7	22.5	.8	....	21.	....	.7	21.	....	.7	22.5	.8	....	21.7	....	....
October 24, 1905	14	154	30.4	31.	.6	....	32.	1.6	....	31.	.6	....	30.5	.1	....	31.1	.7	....
October 24, 1905	15	155	27.1	29.	1.9	....	29.5	2.4	....	29.	1.9	....	28 5	1.4	....	29.	1.9	....
October 24, 1905	16	156	23.6	24.5	.9	....	24.	.4	....	23.7	.1	....	23.5	....	1	23.9	3.	....
October 24, 1905	17	157	29.9	31.5	1.6	....	30.5	.6	....	31.	1.1	....	29.	....	.9	30.5	.6	....
October 24, 1905	18	158	26.8	29.	2.2	....	26.6	....	.2	26.6	....	.2	27.	.2	....	27.3	.5	....
October 24, 1905	19	159	26.3	28.9	2.6	....	27.7	1.4	....	27.3	1.	....	26.7	.4	....	27.6	1.3	....
October 24, 1905	20	160	28.2	31.	2.8	....	29.5	1.3	....	30.	1.8	....	27.5	....	.7	29.5	1.3	....
October 24, 1905	21	161	20.	20.	....	....	19.5	....	.5	19.5	....	.5	16.5	....	3.5	18.8	....	1.2
October 24, 1905	22	162	31.6	33.	1.4	....	32.5	.9	....	32.5	.9	....	33.	1.4	....	32.7	1.1	....
October 24, 1905	23	163	20.1	21.5	1.4	....	20.3	.2	....	19.5	....	.6	20.3	.2	....	20.4	.3	....
October 24, 1905	24	164	24.	23.7	....	.3	23.	....	1.	24.	....	....	23.9	....	.1	23.6	.4	....
October 24. 1905	25	165	23.7	25.	1.3	....	24.	.3	....	24.	.3	....	23.5	....	.2	24.1	.4	....
October 24, 1905	26	166	22.2	27.	4.8	....	28.	5.8	....	27.6	5.4	....	26.6	4.4	....	27.3	5.1	....
October 24, 1905	27	167	17.7	18.5	.8	....	19.	1.3	....	18.5	.8	....	18.	.3	....	18.5	8.	....
October 24, 1905	28	168	20.3	19.6	....	.7	19.6	.7	....	19.	....	1.3	18.5	....	1.8	19.1	....	1.2
October 24, 1905	29	169	16.6	17.	.4	....	17.	.4	....	16.1	....	.5	17.	.4	....	16.7	1.	....
					84.4	130.5		57.8	186.		132.2	191.7		52.4	176.1		66.1	156.3

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					84.4	130.5		57.8	186.		132.2	191.7		52.4	176.1		66.1	156.3
October 24, 1905.......	30	170	15.5	16.5	1.	....	16.5	1.1	....	15.4	....	.1	15.5	....	....	16.	.5	....
October 24, 1905.......	31	171	23.1	23.1	....	....	23.5	.4	....	22.6	....	.5	23.4	.3	....	23.1	....	....
October 24, 1905.......	32	172	19.4	20.	.6	....	19.1	....	.3	19.5	.1	....	19.5	.1	...	19.5	.1	....
October 24, 1905.......	33	173	30.8	32.6	1.8	....	31.	.2	....	31.6	.8	....	30.5	....	.3	31.4	.6	....
October 24, 1905.......	34	174	20.9	21.	.1	....	21.	.1	....	21.5	.6	....	20.	....	.9	20.8	....	.1
October 24, 1905.......	35	175	21.9	22.5	.6	....	22.5	.6	....	22.4	.5	....	21.5	....	.4	22.2	.3	....
October 24, 1905.......	36	176	24.7	24.	....	.7	23.5	....	1.2	24.	....	.7	23.	....	1.7	23 6	....	1.1
October 24, 1907.......	37	177	21.2	22.	.8	....	21.5	.3	....	21.5	.3	....	20.5	....	.7	21.3	.1	....
October 24, 1905.......	38	178	18.	18.	....	....	17.	....	1.	17.5	....	.5	16.5	....	1.5	17.2	....	.8
October 24, 1905.......	39	179	30.5	31.3	.8	....	31.3	.8	....	31.	.5	....	30.3	....	.2	30.9	.4	....
October 24, 1905.......	40	180	24.8	25.	.2	....	25.	.2	....	25.	.2	....	25.	.2	....	25.	.2	....
October 24, 1915.......	41	181	20.	18.5	....	1.5	19.5	....	.5	18.5	....	1.5	18.7	....	1.3	18.8	....	1.2
October 24, 1905.......	42	182	23.9	24.	.1	....	24.5	.6	....	24.3	.4	....	24.3	.4	....	24.2	.3	....
October 24, 1905.......	43	183	21.8	22.5	.7	....	22.	.2	....	22.5	.7	....	22.	.2	....	22.2	.4	....
October 24, 1905.......	44	184	12.8	15.	2.2	....	13.	.2	....	13.5	.7	....	13.5	.7	....	13.7	.9	....
October 24, 1905.......	45	185	26.8	30.3	3.5	....	30.3	3.5	....	30.5	3.7	....	30.3	3.5	....	30.3	3.5	....
October 24, 1905.......	46	186	28.	31.6	3.6	....	29.6	1.6	....	25.7	....	2.3	27.6	....	.4	28.6	.6	....
October 24, 1905.......	47	187	34.3	34.	....	.3	34.	....	.3	34.	....	.3	33.	....	1.3	33.7	....	.6
October 24, 1905.......	48	188	14.7	19.5	4.8	....	19.7	5.	....	19.5	4.8	....	18.3	3.6	....	19.2	4.5	....
October 24, 1905.......	49	189	16.3	17.5	1.2	....	16.5	.2	....	16.5	.2	....	16.5	.2	....	16.7	.4	....
October 24, 1905.......	50	190	17.4	18.5	1.1	....	17.3	....	.1	17.5	.1	....	17.3	....	.1	17.6	.2	....
October 24, 1905.......	51	191	32.8	36.	3.2	....	35.6	2.8	....	35.1	2.3	....	35.	2.2	....	35.4	2.6	....

October 24, 1905.......	52	192	23.1	24.	.9	....	24.6	1.5	....	24.6	1.5	....	24.9	1.8	....	24.5	1.4	....
October 24, 1905.......	53	193	24.9	26.7	1.8	....	26.3	1.4	....	26.3	1.4	....	26.3	1.4	....	26.4	1.5	....
October 24, 1905.......	54	194	26.	27.7	1.7	....	27.	1.	....	27.	1.	....	27.3	1.3	....	27.2	1.2	....
October 24, 1905.......	55	195	18.5	20.5	2.	....	20.7	2.2	....	21.3	2.8	....	20.7	2.2	....	20.8	2.3	....
October 24, 1905.......	56	196	29.4	33.7	4.3	....	31.7	2.3	....	31.5	2.1	....	30.7	1.3	....	31.9	2.5	....
October 24, 1905.......	57	197	10.2	10.5	.3	....	10.4	.2	....	10.3	.1	....	10.7	.5	....	10.4	.2	....
October 24, 1905.......	58	198	19.2	20.3	1.1	....	20.	.8	....	20.4	1.2	....	20.6	1.4	....	20.3	1.1	....
October 24, 1905.......	59	199	24.8	27.	2.2	....	26.5	1.7	....	31.	6.2	....	29.5	4.7	....	28.5	3.7	....
October 24, 1905.......	60	200	24.9	25.5	.6	....	27.	2.1	....	27.	2.1	....	26.	1.1	....	26.3	1.4	....
October 24, 1905.......	61	201	19.3	21.3	2.	....	21.	1.7	....	20.	.7	....	22.5	3.2	....	21.2	1.9	....
October 24, 1905.......	62	202	25.	26.6	1.6	....	25.	....	....	26.5	1.5	....	26.	1.	....	26.	1.	....
October 24, 1905.......	63	203	24.3	26.	1.7	....	24.4	.1	....	23.3	....	1.	24.	....	.3	24.4	.1	....
October 24, 1905.......	64	204	23.6	22.7	....	.9	23.2	....	.4	21.3	....	2.3	22.4	....	1.2	22.4	....	1.2
October 24, 1905.......	65	205	22.3	24.5	2.3	....	23.	.7	....	22.7	.4	....	23.2	.9	....	23.3	.1	....
October 24, 1905.......	66	206	24.7	26.	1.3	....	26.9	2.2	....	26.	1.3	....	27.	2.3	....	26.4	1.7	....
October 24, 1905.......	67	207	29.	30.	1.	....	30.	1.	....	28.5	....	.5	28.5	....	.5	29.2	.2	....
October 24, 1905.......	68	208	29.	30.	1.	....	28.5	....	.5	31.	2.	....	27.	....	2.	29.1	.1	....
October 24, 1905.......	69	209	23.3	23.	....	.3	23.7	.4	....	23.	....	.3	24.	.7	....	24.6	1.3	....
October 24, 1905.......	70	210	20.3	21.3	1.	....	19.6	....	.7	20.	....	.3	19.3	....	1.	20.	....	.3
October 24, 1905.......	71	211	11.2	11.	....	.2	11.	....	.2	11.	....	.2	11.	....	.2	11.	....	.2
October 24, 1905.......	72	212	18.9	19.5	.6	....	18.7	....	.2	19.5	.6	....	20.	1.1	....	19.3	.4	....
October 24, 1905.......	73	213	18.	18.5	.5	....	17.8	....	.2	17.9	....	.1	17.	....	1.	17.8	....	.2
October 24, 1905.......	74	214	19.4	21.	1.6	....	20.3	.9	....	19.5	.1	....	19.	....	.4	19.9	.4	....
October 24, 1905.......	75	215	25.6	26.7	1.1	....	28.5	2.9	....	26.5	.9	....	24.5	....	1.1	24.5	....	1.1
October 24, 1905.......	76	216	15.	15.	....	....	15.	....	....	14.5	....	.5	14.5	....	.5	14.7	....	.3
October 24, 1905.......	77	217	18.7	20.6	1.9	....	19.6	.9	....	19.1	.4	....	18.	....	.7	19.3	.6	....
October 24, 1905.......	78	218	22.5	22.5	....	....	22.5	....	....	24.	1.5	....	24.	1.5	....	23.2	.7	....
October 24, 1905.......	79	219	15.	15.	....	....	15.	....	....	14.7	....	.3	15.	....	....	14.9	....	.1
October 24, 1905.......	80	220	35.3	37.	1.7	....	37.	1.7	....	35.	....	.3	37.	1.7	....	36.	.7	....
October 24, 1905.......	81	221	22.6	23.6	1.	....	22.9	.3	....	22.5	....	.1	22.9	.3	....	22.9	.3	....
October 24, 1905.......	82	222	23.2	24.8	1.6	....	23.	....	.2	21.	....	2.2	22.	....	1.2	22.7	....	.5
October 24, 1905.......	83	223	28.9	30.8	1.9	....	30.	1.1	....	31.	2.1	....	31.3	2.4	....	30.7	1.8	....
October 24, 1905.......	84	224	15.3	15.	....	.3	15.5	.2	....	15.3	....	....	15.	....	.3	15.2	....	.1
October 24, 1905.......	85	225	23.7	24.5	.8	....	24.5	.8	....	25.5	1.8	....	25.	1.3	....	24.8	1.1	....
					105.2	134.7		103.7	191.8		177.8	205.7		97.7	195.2		106.3	234.4

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					150.2	134.7		103.7	191.8		177.8	205.7		97.7	195.2		106.3	234.3
October 24, 1905........	86	226	31.1	32.5	1.4	....	33.	1.9	....	32.	.9	....	31.9	.8	....	32.3	1.2	....
October 24, 1905........	87	227	17.4	22.	4.6	....	21.	3.6	....	20.5	3.1	....	21.	3.6	....	21.1	3.7	....
October 24, 1905........	88	228	24.4	24.5	.1	....	25.	.6	....	25.	.6	....	24.5	.1	....	24.7	.3	....
October 24, 1905........	89	229	21.5	22.	.5	....	22.5	1.	....	23.	1.5	....	23.	1.5	....	22.6	1.1	....
October 24, 1905........	90	230	18.	18.5	.5	....	18.3	.3	....	19.	1.	....	19.	1.	....	18.7	.7	....
October 24, 1905........	91	231	17.7	17.5	....	.2	17.5	....	.2	16.5	....	1.2	17.	....	.7	17.1	....	.6
October 24, 1905........	92	232	32.1	36.	3.9	....	35.	2.9	....	35.6	3.5	....	35.1	3.	....	35.4	3.3	....
October 24, 1905........	93	233	17.2	17.5	.3	....	17.	....	.2	17.	....	.2	17.5	.3	....	17.2	....	....
October 24, 1905........	94	234	20.1	20.3	.2	....	20.	.1	....	19.6	....	.5	19.6	....	.5	19.8	....	.3
October 24, 1905........	95	235	20.4	20.	....	.4	19.4	....	1.	19.3	....	1.1	18.5	....	1.9	19.3	....	1.1
October 24, 1905........	96	236	20.1	21.5	1.4	....	21.5	1.4	....	21.5	1.4	....	22.	1.9	....	21.6	1.5	....
October 24, 1905........	97	237	15.2	16.	.8	....	16.	.8	....	15.5	.3	....	15.7	.5	....	15.8	.6	....
October 24, 1905........	98	238	21.6	23.	1.4	....	23.	1.4	....	22.5	.9	....	23.	1.4	....	22.8	1.2	....
October 24, 1905........	99	239	12.4	13.5	1.1	....	14.	1.6	....	13.8	1.4	....	13.8	1.4	....	13.7	....	1.3
April 17, 1906..........	1	240	39.7	41.3	1.6	....	39.7	....	....	39.5	....	.2	40.3	.6	....	40.2	1.5	....
April 17, 1906..........	2	241	16.1	16.1	....	....	16.2	.1	....	16.4	.3	....	16.7	.6	....	16.3	.2	....
April 17, 1906..........	3	242	22.3	19.	....	3.3	18.8	....	3.5	18.8	....	3.5	18.6	....	3.7	18.8	....	3.5
April 17, 1906..........	4	243	34.3	33.6	....	.7	33.5	....	.8	32.8	....	1.5	34.6	.3	....	33.6	....	.7
April 17, 1906..........	5	244	13.7	11.	....	2.7	10.8	....	2.9	10.6	....	3.1	9.2	....	4.5	10.4	....	3.3
April 17, 1906..........	6	245	20.2	20.2	....	....	20.	....	.2	20.4	.2	....	20.3	.1	....	20.2	....	....
April 17, 1906..........	7	246	24.4	22.8	....	1.6	23.5	....	.9	25.1	.7	....	23.3	....	1.1	23.6	....	.8
April 17, 1906..........	8	247	24.9	23.6	....	1.3	22.8	....	2.1	24.2	....	.7	24.2	....	.7	23.7	....	1.2

April 17, 1906.........	9	248	20.6	20.8	.2	....	20.	....	.6	19.8	....	.8	21.	.4	....	20.4	....	.2
April 17, 1906.........	10	249	26.	25.4	....	.6	25.	....	1.	23.5	....	2.5	24.6	....	1.4	24.6	....	1.4
April 17. 1906.........	11	250	21.4	21.5	.1	....	21.3	....	.1	19.7	....	1.7	22.	.6	....	21.1	....	.3
April 17, 1906.........	12	251	12.4	14.2	1.8	....	13.8	1.4	....	13.6	1.2	....	13.6	1.2	....	13.8	1.4	....
April 17, 1906.........	13	252	39.4	39.	....	.4	38.3	....	1.1	38.7	....	.7	38.	....	1.4	38.5	....	.9
April 17, 1906.........	14	253	21.8	20.	....	1.8	20.4	....	1.4	20.	....	1.8	22.2	....	.4	20.6	....	1.2
April 17, 1906.........	15	254	23.	22.8	....	.2	21.6	....	1.6	22.3	....	.7	23.4	.4	....	22.5	....	.5
April 17, 1906.........	16	255	22.7	22.4	....	.3	22.4	....	.3	22.4	....	.3	21.8	....	.9	22.7	....	.5
April 17, 1906.........	17	256	20.5	20.	....	.5	19.8	....	.7	18.8	....	1.7	16.2	....	4.3	18.7	....	1.8
April 17, 1906.........	18	257	15.1	14.4	....	.7	15.	....	.1	14.8	....	.3	15.2	.1	....	14.8	....	.3
April 17, 1906.........	19	258	32.4	32.	....	.4	33.2	.8	....	32.	....	.4	32.	....	.4	32.3	....	.1
April 17, 1906.........	20	259	12.8	10.9	....	1.9	11.2	....	1.6	10.6	....	2.2	11.4	....	1.4	11.	....	1.8
April 17, 1906.........	21	260	17.8	17.8	....	....	17.4	....	.4	17.8	....	....	17.8	....	....	17.7	....	.1
April 17, 1906.........	22	261	14.7	14.2	....	.5	14.2	....	.5	14.8	.1	....	14.2	....	.5	14.3	....	.4
April 17, 1906.........	23	262	18.5	16.3	....	2.2	15.7	....	2.8	16.1	....	2.4	16.4	....	2.1	16.1	....	2.4
April 17, 1906.........	24	263	17.7	18.2	.5	....	18.2	.5	....	17.2	....	.5	17.	....	.7	17.6	....	.1
April 17, 1906.........	25	264	30.7	37.4	6.7	....	37.6	6.9	....	37.8	7.1	....	35.5	4.8	....	37.	6.3	....
April 17, 1906.........	26	265	29.6	27.6	....	2.	28.9	....	.7	28.6	....	1.	29.3	....	.3	28.6	....	1.
April 17, 1906.........	27	266	31.1	29.9	....	1.2	29.8	....	1.3	30.8	....	.3	32.8	1.7	....	30.8	....	.3
April 17, 1906.........	28	267	18.2	18.2	....	....	18.4	.2	....	18.1	....	.1	15.6	....	2.6	17.5	....	.7
April 17, 1906.........	29	268	22.9	23.7	.8	....	23.	.1	....	22.5	....	.4	23.6	.7	....	23.2	.3	....
April 17, 1906.........	30	269	18.7	17.4	....	1.3	17.	....	1.7	15.4	....	3.3	14.2	....	4.5	16.	....	2.7
April 17, 1906.........	31	270	18.9	16.2	....	2.7	15.2	....	3.7	15.4	....	3.4	15.8	....	3.1	15.6	....	3.3
April 17, 1906.........	32	271	30.2	30.8	.6	....	29.6	....	.6	31.4	1.2	....	29.	....	1.2	30.2	....	....
April 17, 1906.........	33	272	45.4	43.6	....	1.8	41.6	....	3.8	42.	....	3.4	39.9	....	5.5	41.7	....	3.7
April 17, 1906.........	34	273	29.	37.2	8.2	....	37.4	8.4	....	39.	10.	....	38.4	9.4	....	38.	9.	....
April 17, 1906.........	35	274	27.6	25.4	....	2.2	26.4	....	1.2	25.4	....	2.2	25.8	....	1.8	20.7	....	6.9
April 17, 1906.........	36	275	19.9	20.4	.5	....	18.2	....	1.7	19.	....	.9	18.8	....	1.1	19.1	....	.8
April 17, 1906.........	37	276	39.3	37.	....	2.3	35.	....	4.3	38.	....	1.3	38.9	....	.4	37.2	....	2.1
April 17, 1906.........	38	277	15.8	10.6	....	5.2	10.9	....	4.9	13.	....	2.8	14.5	....	1.3	12.2	....	3.6
April 17, 1906.........	39	278	38.9	36.9	....	2.	36.2	....	2.7	37.5	....	1.4	39.	.1	....	37.4	....	1.5
April 17, 1906.........	40	279	23.	22.	....	1.	22.2	....	.8	22.6	....	.4	22.6	....	.4	22.3	....	.7
April 17, 1906.........	41	280	29.7	29.2	....	.5	27.8	....	1.9	29.	....	.7	30.	.3	....	29.	....	.7
April 17, 1906.........	42	281	16.1	15.	....	1.1	14.9	....	1.2	14.2	....	2.1	15.	....	1.1	14.7	....	1.4
					187.4	177.7		136.7	246.3		213.2	257.7		132.5	245.1		138.6	297.5

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					187.4	177.7		136.7	246.3		213.2	257.7		132.5	245.1		138.6	297.5
April 17, 1906	43	282	20.9	20.8	....	.1	20.6	....	.3	19.8	....	1.8	20.6	....	.3	20.4	....	.5
April 17, 1906	44	283	24.6	24.6	....	....	24.2	....	.4	25.	.4	....	24.8	.2	....	25.9	1.3	....
April 17, 1906	45	284	46.	45.	....	1.	42.8	....	3.2	46.9	....	.9	46.	....	....	45.1	....	.9
April 17, 1906	46	285	21.8	21.7	....	1	21.8	....	....	21.8	....	....	21.7	....	.1	21.7	....	.1
April 17, 1906	47	286	37.	36.2	.8	....	37.1	.1	....	38.4	1.4	....	35.8	1.2	....	36.8	....	.2
April 17, 1906	48	287	26.	24.6	....	1.4	23.4	....	2.6	23.8	....	2.8	25.6	....	.4	24.3	....	1.7
April 17, 1906	49	288	18.2	16.5	....	1.7	15.5	....	2.7	15.5	....	2.7	16.4	....	1.8	15.9	....	2.3
April 17, 1906	50	289	14.2	13.8	....	.4	13.7	....	.5	12.5	....	1.7	13.8	....	.4	13.4	....	.8
April 17, 1906	51	290	8.	8.1	.1	....	7.7	....	.3	8.3	.3	....	7.9	....	.1	8.	....	....
April 17, 1906	52	291	27.5	28.	.5	....	26.5	....	.9	26.9	....	.6	28.5	.1	....	27.5	....	....
April 17, 1906	53	292	7.7	8.	.3	....	8.2	.5	....	8.3	.6	....	7.8	.1	....	8.	.3	....
April 17, 1906	54	293	21.6	22.2	.6	....	21.4	....	.2	21.8	.2	....	22.6	1.	....	22.	.4	....
April 17, 1906	55	294	23.4	23.	....	.4	23.6	.2	....	23.	....	.4	23.4	....	....	23.2	....	.2
April 17, 1906	56	295	14.8	19.	4.2	....	19.	4.2	....	18.	3.2	....	17.	2.2	....	18.2	3.4	....
April 17, 1906	57	296	24.5	23.	....	1.5	22.6	....	1.7	23.4	....	1.1	23.8	....	.7	23.2	....	1.3
April 17, 1906	58	297	21.1	20.	....	1.1	21.	....	.1	21.	....	.1	20.8	....	.3	20.7	....	.4
April 17, 1906	59	298	26.2	25.6	....	.6	25.9	....	.3	24.3	....	1.9	26.3	.1	....	25.5	....	.7
April 17, 1906	60	299	18.4	17.9	....	.5	17.9	....	.5	18.	....	.4	18.	....	.4	17.9	....	.5
April 17, 1906	61	300	35.8	30.9	....	4.9	29.8	....	.6	30.9	....	4.9	28.4	....	7.4	30.	....	5.8
April 17, 1906	62	301	28.	26.8	....	1.2	26.	....	2.	27.4	....	.6	30.	2.	....	27.5	....	.5
April 17, 1906	63	302	22.7	21.	....	1.7	21.	....	1.7	21.8	....	.9	22.5	....	.3	21.5	....	1.2
April 17, 1906	64	303	35.4	34.	....	1.4	33.2	....	2.2	36.7	1.3	....	33.8	....	1.6	34.1	....	1.3

April 17, 1906.........	65	304	24.4	22.4	....	2.	21.4	....	3.	22.8	....	1.6	23.4	....	1.	22.5	....	1.9
April 17, 1906.........	66	305	16.3	16.	....	.3	15.7	....	.6	14.	....	2.3	15.8	....	.5	15.3	....	1.
April 17, 1906.........	57	306	34.6	32.	....	2.6	29.8	....	4.8	30.2	....	4.4	30.7	....	3.9	30.6	....	4.
April 17, 1906.........	58	307	36.9	35.2	....	1.7	34.4	....	2.5	35.5	....	1.4	34.4	....	2.5	36.1	....	.8
April 17, 1906.........	59	308	25.	22.6	....	2.6	22.2	....	2.8	22.8	....	2.2	23.5	....	1.5	22.7	....	2.3
April 17, 1906.........	60	309	13.9	10.1	....	3.8	10.9	....	3.	10.1	....	3.8	10.7	....	3.2	10.4	....	3.5
April 17, 1906.........	61	310	30.9	32.4	1.5	....	26.7	....	4.2	22.	....	8.9	26.	....	4.9	26.7	....	4.2
April 17, 1906.........	62	311	19.5	18.4	....	1.1	18.7	....	.8	18.1	....	1.4	18.6	....	.9	18.4	....	1.1
April 17, 1906.........	63	312	14.8	13.6	....	1.2	12.2	....	2.6	10.8	....	4.	10.2	....	4.6	11.7	....	3.1
April 17, 1906.........	64	313	32.1	33.5	1.4	....	32.5	....	.4	33.9	1.8	....	33.7	1.6	....	33.4	1.3	....
April 17, 1906.........	65	314	28.3	27.	....	1.3	27.	....	1.3	27.4	....	.9	28.	....	.3	27.3	....	1.
April 17, 1906.........	66	315	18.	17.2	....	.8	16.3	....	1.7	16.5	....	1.5	16.2	....	1.8	16.5	....	1.5
April 17, 1906.........	67	316	24.9	23.4	....	1.5	22.8	....	2.1	24.	....	.9	24.9	....	....	23.7	....	1.2
April 17, 1906.........	68	317	23.8	22.4	....	1.4	20.	....	3.2	20.2	....	3.6	19.5	....	4.3	20.5	....	3.3
April 17, 1906.........	69	318	11.1	10.	....	1.1	10.6	....	.5	10.	....	1.1	10.1	....	1.	10.1	....	1.
April 17, 1906.........	70	319	34.6	33.6	....	1.	34.2	....	.4	34.	....	.6	32.	....	2.6	33.4	....	1.2
April 17, 1906.........	71	320	34.3	33.4	....	.9	34.	....	.3	33.8	....	.5	34.5	.2	....	33.9	....	.4
April 17, 1906.........	72	321	22.2	21.8	....	.4	21.8	....	.4	22.4	.2	....	21.2	....	1.	21.8	....	.4
April 17, 1906.........	73	322	15.2	15.	....	.2	15.2	....	....	14.	....	1.2	14.7	....	.5	14.7	....	.5
April 17, 1906.........	74	323	25.1	24.4	....	.7	24.2	....	.9	24.4	....	.7	24.6	....	.5	24.4	....	.7
April 17, 1906.........	75	324	17.8	15.8	....	.2	17.	....	.8	16.8	....	1.	16.4	....	1.4	16.5	....	1.3
April 17, 1906.........	76	325	16.4	16.	....	.4	16.6	.2	....	15.4	....	1.	16.8	.4	....	16.2	....	.2
April 17, 1906.........	77	326	23.1	23.1	....	....	22.3	....	.8	13.8	....	9.3	17.	....	6.1	19.	....	4.1
April 17, 1906.........	78	327	22.6	23.8	1.2	....	24.4	1.8	....	23.8	1.2	....	22.8	.2	....	23.7	1.1	....
April 17, 1906.........	79	328	16.1	15.9	....	.2	14.5	....	1.6	13.	....	3.1	15.	....	1.1	14.6	....	1.5
April 17, 1906.........	80	329	11.5	12.2	.7	....	11.8	.3	....	12.	.5	....	11.6	.1	....	11.9	.4	....
April 17, 1906.........	81	330	22.8	21.6	....	1.2	21.6	....	1.2	21.8	....	1.	23.2	.4	....	22.	....	.8
April 17, 1906.........	82	331	13.5	13.	....	.5	13.2	....	.3	13.8	.3	....	14.	.5	....	13.5	....	....
April 17, 1906.........	83	332	16.5	17.	.5	....	16.5	....	....	17.	.5	....	17.	.5	....	16.8	.3	....
April 17, 1906.........	84	333	24.2	23.7	....	.5	23.5	....	.7	23.8	....	.4	24.3	.1	....	23.8	....	.4
April 17, 1906.........	85	334	13.1	13.2	.1	....	13.	....	.1	13.2	.1	....	13.7	.6	....	13.2	.1	....
April 17, 1906.........	86	335	28.	28.5	.5	....	28.2	.2	....	27.9	....	.1	28.	....	....	28.1	.1	....
April 17, 1906.........	87	336	29.4	29.6	.2	....	29.	....	.4	28.3	....	.1	27.9	....	1.5	28.7	....	.7
April 17, 1906.........	88	337	16.1	16.8	.7	....	15.4	....	.7	14.6	....	1.5	17.	.9	....	15.9	....	.2
					200.7	222.9		144.2	308.6		225.2	337.1		144.9	304.1		147.3	358.2

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					200.7	222.9		144.2	308.6		225.2	337.1		144.9	304.1		147.3	358.2
April 17, 1906	89	338	18.5	19.	.5		18.		.5	18.9	.4		18.5			18.6	.1	
April 17, 1906	90	339	22.3	20.4		1.9	21.4		.9	22.3			21.5		.8	21.4		.9
November 6, 1906	1	340	21.6	20.8		.8	21.4		.2	22.	.6		22.4	.8		21.6		
November 6, 1906	2	341	39.3	41.2	1.9		40.2	.9		39.		.3	43.2	3.9		40.9	1.6	
November 6, 1906	3	342	16.7	16.8	.1		15.8		.9	16.6		.1	15.6		1.1	16.2		.5
November 6, 1906	4	343	20.9	20.		.9	21.	.1		20.		.9	21.8	.9		20.7		.2
November 6, 1906	5	344	20.	20.4	.4		19.6		.4	19.		1.	18.6		1.4	19.4		.6
November 6, 1906	6	345	15.7	17.6	1.9		17.2	1.5		16.6	.9		16.4	.7		16.9	1.2	
November 6, 1906	7	346	21.6	23.8	2.2		22.2	.6		21.4		.2	20.		1.6	21.8	.2	
November 6, 1906	8	347	18.9	20.8	1.9		19.8	.9		21.	2.1		19.8	.9		20.3	1.4	
November 6, 1906	9	348	25.	25.2	.2		25.8	.8		24.5		.5	23.6		1.4	24.7		.3
November 6, 1906	10	349	12.6	15.6	3.		15.2	2.6		17.	4.6		15.4	2.8		15.8	3.2	
November 6, 1906	11	350	26.2	26.		.2	24.5		1.7	26.2			24.8		1.4	25.3		.9
November 6, 1906	12	351	20.4	20.8	.4		20.6	.2		21.6	1.2		21.8	1.4		21.2	.8	
November 6, 1906	13	352	20.1	20.1			20.2	.1		20.		.1	20.		.1	20.		.1
November 6, 1906	14	353	15.4	15.4			15.		.4	14.8		.6	14.6		.8	14.9		.5
November 6, 1906	15	354	23.2	21.8		1.4	21.2		2.	21.2		2.	21.4		1.8	21.4		1.8
November 6, 1906	16	355	17.5	17.8	.3		17.8	.3		17.6	.1		17.6	.1		17.7	.2	
November 6, 1906	17	356	18.6	18.8	.2		19.2	.6		18.8	.2		18.8	.2		18.9	.3	
November 6, 1906	18	357	15.	14.8		.2	14.6		.4	15.2	.2		15.2	.2		15.		
November 6, 1906	19	358	29.2	28.		1.2	28.		1.2	28.4		.8	28.4		.8	28.2		1.
November 6, 1906	20	359	8.3	7.2		1.1	7.6		.7	7.4		.9	7.		1.3	7.3		1.

November 6, 1906......	21	360	14.2	14.8	.6	....	14.8	.6	....	15.2	1.	....	15.2	1.	....	15.	.8	....
November 6, 1906......	22	361	29.2	29.6	.4	....	29.6	.4	....	29.4	.2	....	29.	....	.2	29.4	.2	....
November 6, 1906......	23	362	21.6	22.	.6	....	22.	.6	....	23.	1.6	....	23.	1.6	....	22.5	.9	....
November 6, 1906......	24	363	21.3	20.2	....	1.1	20.8	....	.5	19.8	....	1.5	21.	....	.3	20.4	....	.9
November 6, 1906......	25	364	27.4	26.3	....	1.1	27.6	.2	....	25.6	....	1.8	25.4	....	2.	26.2	....	1.2
November 6, 1906......	26	365	25.2	25.4	.2	....	24.2	....	1.	25.2	....	....	25.2	....	....	25.	....	.2
November 6, 1906......	27	366	15.	14.2	....	.8	14.8	....	.2	14.8	....	.2	15.	....	....	14.4	....	.6
November 6, 1906......	28	367	33.3	32.7	....	.6	33.4	.1	....	32.8	....	.5	32.8	....	.5	32.9	....	.4
November 6, 1906......	29	368	13.4	13.8	.4	....	13.8	.4	....	13.8	.4	....	13.	....	.4	13.6	.2	....
November 6, 1906......	30	369	15.8	15.	....	.8	15.4	....	.4	15.2	....	.6	15.2	....	.6	15.2	....	.6
November 6, 1906......	31	370	26.4	27.6	1.2	....	28.2	1.8	....	27.9	1.5	....	28.6	4.2	....	28.	1.6	....
November 6, 1906......	32	371	29.6	29.8	.2	....	29.2	....	.4	30.	.4	....	29.2	....	.4	29.5	....	.1
November 6, 1906......	33	372	12.6	14.8	2.2	....	14.6	2.	....	14.4	1.8	....	13.8	1.2	....	14.4	1.8	....
November 6, 1906......	34	373	17.4	15.6	....	1.8	15.6	....	1.8	15.8	....	1.6	15.8	....	1.6	15.7	....	1.7
November 6, 1906......	35	374	21.2	22.	.8	....	22.6	1.4	....	23.2	2.	....	23.6	2.4	....	22.8	1.6	....
November 6, 1906......	36	375	17.4	16.4	....	1.	16.4	....	1.	16.6	....	.8	16.6	....	.8	16.5	....	.9
November 6, 1906......	37	376	8.9	8.6	....	.3	8.6	....	.3	9.2	.3	....	9.2	.3	....	8.9	....	....
November 6, 1906......	38	377	8.7	7.4	....	1.3	7.	....	1.7	6.6	....	2.1	6.4	....	2.3	6.8	....	1.9
November 6, 1906......	39	378	25.7	23.2	....	2.5	24.8	....	.9	25.	....	.7	25.	....	.7	24.5	....	1.2
November 6, 1906......	40	379	14.5	17.9	3.4	....	15.8	1.3	....	17.7	3.2	....	16.6	2.1	....	17.	2.5	....
November 6, 1906......	41	380	15.9	16.4	.5	....	16.2	.3	....	15.8	.1	....	15.8	.1	....	16.	.1	....
November 6, 1906......	42	381	22.9	20.6	....	2.3	21.	....	1.9	20.8	....	2.1	20.8	....	2.1	20.8	....	2.1
November 6, 1906......	43	382	14.8	14.2	....	.6	13.6	....	1.2	14.4	....	.4	14.	....	.8	14.	....	.8
November 6, 1906......	44	383	7.7	8.6	.9	....	8.	.3	....	8.2	.5	....	8.2	.5	....	8.2	.5	....
November 6, 1906......	45	384	10.1	10.6	.5	....	10.6	.5	....	10.2	.1	....	10.6	.5	....	10.5	.4	....
November 6, 1906......	46	385	15.2	15.2	....	....	15.	....	.2	14.6	....	.6	15.8	.6	....	15.1	....	.1
November 6, 1906......	47	386	13.5	13.2	....	.3	12.8	....	.7	12.8	....	.7	13.	....	.5	12.9	....	.6
November 6, 1906......	48	387	15.1	15.	....	.1	15.2	.1	....	15.	....	.1	15.	....	.1	15.	....	.1
November 6, 1906......	49	388	26.2	26.2	....	....	26.8	.6	....	27.6	1.4	....	25.	....	1.2	26.4	.2	....
November 6, 1906......	50	389	23.5	24.6	1.1	....	24.2	.7	....	24.2	.7	....	25.2	1.7	....	24.5	1.	....
November 6, 1906......	51	390	21.	22.2	1.2	....	21.2	.2	....	22.2	1.2	....	22.	.1	....	21.9	.9	....
November 6, 1906......	52	391	28.6	28.1	....	.5	27.2	....	1.4	27.6	....	1.	25.8	....	2.8	27.1	1.5	....
November 6, 1906......	53	392	18.1	19.3	1.2	....	19.	.9	....	19.	.9	....	21.	2.9	....	19.5	1.4	....
November 6, 1906......	54	393	18.2	18.8	.6	....	19.2	1.	....	18.2	....	....	19.	.8	....	18.8	.6	....
					229.7	245.7		166.2	331.5		252.8	359.2		175.9	333.9		172.5	379.4

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					229.7	245.7		166.2	331.5		252.8	359.2		175.9	333.9		172.5	379.4
November 6, 1906......	55	394	26.3	27.2	.9	....	27.2	.9	....	26.2	.1	....	25.	....	1.3	26.4	.1	....
November 6, 1906......	56	395	18.6	18.8	.2	....	18.	....	.6	18.4	....	.2	18.4	....	.2	18.2	....	.4
November 6, 1906......	57	396	23.9	22.6	....	1.3	21.8	....	2.1	21.6	....	2.3	21.	....	2.9	21.7	....	2.2
November 6, 1906......	58	397	18.2	17.8	....	.4	17.3	....	.9	17.8	....	.4	18.2	....	....	17.7	....	.5
November 6, 1906......	59	398	22.9	22.6	....	.3	22.6	....	.3	22.4	....	.5	21.8	....	1.1	22.3	....	.6
November 6, 1906......	60	399	15.4.	15.	....	.4	14.6	....	.8	14.4	....	1.	14.6	....	.8	14.6	....	.8
November 6, 1906......	61	400	26.	23.	....	.3	24.4	....	1.6	24.	....	2.	23.	....	3.	23.6	....	2.4
November 6, 1906......	62	401	23.7	22.4	....	1.3	25.2	1.5	....	25.	1.3	....	25.	1.3	....	24.4	.7	....
November 6, 1906......	63	402	31.3	31.4	.1	....	31.8	.5	....	31.6	.3	....	31.2	.1	....	31.5	.2	....
November 6, 1906......	64	403	22.1	22.2	.1	....	20.	....	2.1	20.6	....	1.5	22.2	.1	....	21.2	....	.9
November 6, 1906......	65	404	28.5	28.4	....	.1	28.6	.1	....	28.4	....	.1	28.	....	.5	28.3	....	.2
November 6, 1906......	66	405	20.4	20.6	.2	....	19.4	....	1.	19.5	....	.9	20.3	....	.1	19.9	....	.5
November 6, 1906......	67	406	28.9	27.8	....	1.1	27.4	....	1.5	27.4	....	1.5	26.6	....	2.3	27.3	....	1.6
November 6, 1906......	68	407	24.2	24.8	.6	....	25.2	.1	....	25.2	1.	....	25.4	1.2	....	25.1	.9	....
November 6, 1906......	69	408	28.5	27.8	....	.7	28.4	....	.1	28.	....	.5	27.2	....	1.3	27.8	....	.7
November 6, 1906......	70	409	33.4	33.6	.2	....	33.2	....	.2	32.	....	1.4	33.	....	.4	32.9	....	.5
November 6, 1906......	71	410	22.9	22.6	....	.3	22.	....	.9	22.6	....	.3	23.6	.7	....	22.7	....	.2
November 6, 1906......	72	411	25.3	23.	....	2.3	24.4	....	.9	23.6	....	1.7	24.4	....	.9	23.8	....	1.5
November 6, 1906......	73	412	19.8	19.6	....	.2	18.1	....	1.7	17.8	....	2.1	18.3	....	1.5	18.4	....	1.4
November 6, 1906......	74	413	24.8	26.8	2.	....	25.2	.4	....	25.8	1.	....	26.4	1.6	....	26.	1.2	....
November 6, 1906......	75	414	14.7	15.	.3	....	14.8	.1	....	14.8	.1	....	15.	.3	....	14.9	.2	....
November 6, 1906......	76	415	21.7	22.8	1.1	....	22.1	.4	....	22.6	.9	....	22.8	1.1	....	22.5	.8	....

November 6, 1906......	77	416	18.4	18.2	....	.2	17.6	....	.8	17.6	....	.8	18.2	....	.2	17.9	....	.5
November 6, 1906......	78	417	15.7	12.6	....	3.1	12.	....	3.7	12.	....	3.7	13.	....	2.7	12.4	....	3.3
November 6, 1906......	79	418	12.3	13.2	.9	....	12.8	.5	....	13.	.7	....	13.6	1.3	....	13.1	.8	....
November 6, 1906......	80	419	13.4	12.5	....	.9	12.4	....	1.	12.8	....	.6	12.3	....	1.1	12.5	....	.9
November 6, 1906......	81	420	20.3	21.4	1.1	....	20.6	.3	....	21.6	1.3	....	21.4	1.1	....	21.2	.9	....
November 6, 1906......	82	421	15.4	16.4	1.	....	15.4	....	....	16.2	.8	....	16.8	1.4	....	16.2	.8	....
November 6, 1906......	83	422	24.9	24.2	....	.5	25.2	.3	....	25.	.1	....	25.8	.9	....	25.1	.2	....
November 6, 1906......	84	423	13.2	13.6	.4	....	13.4	.2	....	13.2	....	....	13.	....	.2	13.3	.1	....
November 6, 1906......	85	424	21.6	22.8	1.2	....	22.	.4	....	22.	.4	....	22.6	1.	....	22.3	.7	....
November 6, 1906......	86	425	17.8	18.8	1.	....	18.	.2	....	18.4	.6	....	18.6	.8	....	18.4	.6	....
November 6, 1906......	87	426	11.5	12.	.5	....	11.2	....	.3	12.2	.7	....	10.6	....	.9	11.5	....	....
November 6, 1906......	88	427	21.9	20.6	....	1.3	21.	....	.9	19.8	....	2.1	20.4	....	1.5	20.4	....	1.5
November 6, 1906......	89	428	19.4	17.8	....	1.6	18.8	....	.6	19.2	....	.2	18.6	....	.8	18.6	....	.8
November 6, 1906......	90	429	19.8	19.6	....	.2	20.4	.6	....	20.6	.8	....	21.2	1.4	....	20.4	.6	....
November 6, 1906......	91	430	15.9	16.2	.3	....	16.2	.3	....	15.8	....	.1	16.4	.5	....	16.1	.2	....
November 6, 1906......	92	431	12.2	12.8	.6	....	12.6	.4	....	12.6	.4	....	12.9	.7	....	12.7	.5	....
November 6, 1906......	93	432	13.1	13.2	.1	....	13.2	.1	....	13.2	.1	....	13.	....	.1	13.1	....	....
November 6, 1906......	94	433	20.9	21.1	.2	....	21.	.1	....	21.	.1	....	21.8	.9	....	21.2	.3	....
November 6, 1906......	95	434	22.7	25.	2.3	....	24.4	1.7	....	24.8	2.1	....	24.4	1.7	....	24.6	1.9	....
November 6, 1906......	96	435	12.1	12.6	.5	....	12.6	.5	....	13.	.9	....	12.6	.5	....	12.7	.6	....
November 6, 1906......	97	436	19.2	19.8	.6	....	19.	....	.2	19.4	.2	....	19.	....	.2	19.3	.1	....
November 6, 1906......	98	437	26.2	25.6	....	.6	26.	....	.2	27.	....	.8	26.8	.4	....	26.3	.1	....
November 6, 1906......	99	438	11.6	11.6	....	....	12.6	1.	....	12.8	1.2	....	12.4	.8	....	12.3	.7	....
November 6, 1906......	100	439	14.8	15.	.2	....	15.1	.3	....	16.	1.2	....	16.6	1.8	....	15.6	.8	....
April 10, 1907.........	1	440	38.4	37.8	....	.6	36.6	....	1.8	37.2	....	1.2	37.6	....	.8	37.3	....	1.1
April 10, 1907.........	2	441	42.4	41.8	....	.6	39.4	....	3.	41.2	....	1.2	36.8	....	5.6	39.8	....	2.6
April 10, 1907.........	3	442	10.	10.7	.7	....	9.5	....	.5	8.6	....	1.4	8.8	....	1.2	9.4	....	.6
April 10, 1907.........	4	443	14.6	15.	.4	....	14.6	....	....	14.4	....	.2	13.5	....	1.1	14.3	....	.3
April 10, 1907.........	5	444	22.5	22.6	.1	....	22.4	....	.1	22.	....	.5	22.2	....	.3	22.3	....	.2
April 10, 1907.........	6	445	20.7	21.2	.5	....	20.8	.1	....	20.4	....	.3	21.1	.4	....	20.8	.1	....
April 10, 1907.........	7	446	42.7	43.2	.5	....	42.4	....	.3	40.8	....	1.9	42.	....	.7	42.1	....	.6
April 10, 1907.........	8	447	18.8	18.2	....	.6	18.8	....	....	17.8	....	1.	18.1	....	.7	18.2	....	.6
April 10, 1907.........	9	448	9.7	10.	.3	....	10.	.3	....	10.2	.5	....	10.5	.8	....	10.1	.4	....
April 10, 1907.........	10	449	9.6	10.2	.6	....	9.4	....	.2	10.4	.8	....	9.	....	.6	9.7	.1	....
					248.4	263.6		177.5	358.8		270.4	391.6		198.7	367.9		187.1	406.8

TABLE OF NON-REACTING COWS—*Continued*

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss
					248.4	263.6		177.5	358.8		270.4	391.6		198.7	367.9		187.1	406.8
April 10, 1907.........	11	450	22.	23.4	1.4	....	22.6	.6	....	22.6	.6	....	21.8	....	.2	22.6	.6	....
April 10, 1907.........	12	451	19.7	18.2	....	1.5	18.6.	....	1.1	18.6	....	1.1	18.6	....	1.1	18.5	....	1.2
April 10, 1907.........	13	452	28.3	28.	....	.3	28.	....	.3	29.2	.9	....	30.4	2.1	....	28.9	.6	....
April 10, 1907.........	14	453	11.	10.8	....	.2	11.6	.6	....	10.8	....	.2	10.8	....	.2	11.	....	....
April 10, 1907.........	15	454	22.1	21.6	....	.5	21.6	....	.5	20.8	....	1.3	21.4	....	.7	21.3	....	.8
April 10, 1907.........	16	455	13.7	13.8	.1	....	14.	.3	....	12.8	....	.9	12.8	....	.9	13.3	....	.4
April 10, 1907.........	17	456	35.8	36.2	.4	....	35.2	....	.6	34.	....	1.8	36.2	.4	....	35.4	....	.4
April 10, 1907.........	18	457	21.	21.8	.8	....	21.8	.8	....	21.6	.6	....	21.6	.6	....	21.7	.7	....
April 10, 1907.........	19	458	29.	29.	....	....	27.3	....	1.8	26.2	....	2.8	27.8	....	1.2	27.5	....	1.5
April 10, 1907.........	20	459	18.2	18.2	....	....	18.	....	.2	18.	....	.2	17.8	....	.4	18.	....	2.
April 10, 1907.........	21	460	21.6	21.4	....	.2	20.4	....	1.2	21.	....	.6	20.4	....	1.2	20.8	....	.8
April 10, 1907.........	22	461	31.4	33.8	2.4	....	32.4	1.	....	32.2	.8	....	32.	.6	....	32.6	1.2	....
April 10, 1907.........	23	462	29.6	29.6	....	....	28.8	....	.8	29.	....	.6	28.2	....	1.4	28.9	....	.7
April 10, 1907.........	24	463	29.5	29.8	.3	....	29.2	....	.3	28.4	....	1.1	29.4	....	.1	29.2	....	.3
April 10, 1907.........	25	464	26.	26.1	.1	....	25.2	....	.8	25.4	....	.6	25.2	....	.8	25.4	....	.6
April 10, 1907.........	26	465	17.2	17.8	.6	....	17.	....	.2	17.4	.2	....	17.8	.6	....	15.	....	2.2
April 10, 1907.........	27	466	13.3	12.2	....	1.1	11.	....	2.3	11.2	....	2.1	11.	....	2.3	11.3	....	2.
April 10, 1907.........	28	467	27.	25.6	....	1.4	25.	....	2.	25.	....	2.	25.2	....	1.8	25.2	....	1.8
April 10, 1907.........	29	468	17.	17.	....	....	16.4	....	.6	17.	....	....	17.4	.4	....	16.9	....	.1
April 10, 1907.........	30	469	29.7	29.	....	.7	28.8	....	.9	28.4	....	1.3	29.4	....	.3	28.9	....	.8
April 10, 1907.........	31	470	18.9	18.	....	.9	17.3	....	1.6	16.2	....	2.7	16.8	....	2.1	17.	....	1.9
April 10, 1907.........	32	471	46.2	44.2	....	2.	44.	....	2.2	43.	....	3.2	44.2	....	2.	43.8	....	2.4

April 10, 1907..........	33	472	30.8	31.6	.8	....	29.8	....	1.	28.6	....	2.2	28.	....	2.8	29.5	....	1.3
April 10, 1907..........	34	473	23.6	23.4	....	.2	23.	....	.6	21.4	....	2.2	21.2	....	2.4	22.2	....	1.4
April 10, 1907..........	35	474	20.6	19.5	....	1.1	19.4	....	1.2	19.4	....	1.2	19.8	....	.8	19.5	....	1.1
April 10, 1907..........	36	475	17.	18.2	1.2	....	17.8	.8	....	19.4	2.4	....	18.4	1.4	....	18.4	1.4	....
April 10, 1907..........	37	476	28.3	28.4	.1	....	27.	....	1.3	29.	.7	....	28.	....	.3	28.1	....	.2
April 10, 1907..........	38	477	32.1	36.4	4.3	....	36.	3.9	....	35.4	3.3	....	35.6	3.5	....	35.8	3.7	....
April 10, 1907..........	39	478	20.3	22.	1.7	....	21.2	.9	....	21.	.7	....	21.	.7	....	21.3	1.	....
April 10, 1907..........	40	479	22.3	25.	2.7	....	24.4	2.1	....	24.4	2.1	....	24.6	2.3	....	24.6	2.3	....
April 10, 1907..........	41	480	22.4	21.8	....	.6	21.2	....	1.2	22.6	.2	....	22.3	....	.1	21.9	....	.5
April 10, 1907..........	42	481	18.5	19.6	1.1	....	17.4	....	1.1	18.6	.1	....	18.4	....	.1	18.5	....	....
April 10, 1907..........	43	482	21.5	21.4	....	.1	21.6	.1	....	21.8	.3	....	22.6	1.1	....	21.8	.3	....
April 10, 1907..........	44	483	20.	23.	3.	....	23.4	3.4	....	23.4	3.4	....	23.2	3.2	....	23.2	3.2	....
April 10, 1907..........	45	484	18.4	17.6	....	.8	17.	....	1.4	16.2	....	2.2	16.	....	2.4	16.7	....	1.7
April 10, 1907..........	46	485	28.1	27.	....	1.1	27.6	....	.5	27.6	....	.5	28.	....	.1	27.5	....	.6
April 10, 1907..........	47	486	42.6	45.4	2.8	....	45.	2.4	....	43.4	.8	....	43.	.4	....	44.2	1.6	....
April 10, 1907..........	48	487	16.1	14.6	....	1.3	14.6	....	1.5	15.	....	1.1	14.8	....	1.3	14.8	....	1.3
April 10, 1907..........	49	488	37.3	36.	....	1.3	35.	....	2.3	35.2	....	2.1	35.4	....	1.9	35.4	....	1.9
April 10, 1907..........	50	489	35.1	34.8	....	.9	33.6	....	1.5	34.8	....	.3	31.8	....	3.3	33.7	....	1.4
April 10, 1907..........	51	490	15.9	17.4	1.5	....	17.	1.1	....	16.4	.5	....	16.6	.7	....	16.8	.9	....
April 10, 1907..........	52	491	19.9	22.	2.1	....	21.6	1.7	....	21.6	1.7	....	22.	2.1	....	21.8	1.9	....
April 10, 1907..........	53	492	33.9	34.4	.5	....	33.8	....	.1	33.2	....	.7	32.8	....	1.1	33.5	....	.4
April 10, 1907..........	54	493	16.5	16.6	.1	....	16.	....	.5	16.2	....	.3	15.8	....	.7	16.1	....	.4
April 10, 1907..........	55	494	13.6	12.8	....	.8	13.	....	.6	13.2	....	.4	12.8	....	.8	12.9	....	.7
April 10, 1907..........	55	495	29.5	30.4	1.1	....	29.1	....	.4	28.4	....	1.1	26.2	....	3.3	28.5	....	1.
April 10, 1907..........	57	496	15.4	14.	....	1.4	14.4	....	1.	15.	....	.4	14.8	....	.6	14.5	....	.9
April 10, 1907..........	58	497	13.	13.8	.8	....	12.2	....	.8	12.4	....	.6	13.	....	....	12.8	....	.2
April 10, 1907..........	59	498	12.8	13.2	.4	....	12.5	....	.3	12.	....	.8	12.4	....	.4	12.5	....	.3
April 10, 1907..........	60	499	18.2	18.4	.2	....	18.6	.4	....	18.4	.2	....	18.2	....	....	18.4	.2	....
April 10, 1907..........	61	500	11.4	12.	.6	....	11.4	....	....	11.4	....	....	11.4	....	....	11.5	.1	....
					281.5	282.1		195.6	392.6		289.2	430.2		218.8	406.9		206.3	441.1

TABLE OF REACTING COWS

Date of test	Test No. of animal	Serial No. of animal	Average daily lbs. of milk for week preceding test	Lbs. of milk first 24 hours following test			Lbs. of milk second 24 hours following test			Lbs. of milk third 24 hours following test			Lbs. of milk fourth 24 hours following test			Daily average lbs. of milk for 4 days following test		
					Gain	Loss		Gain	Loss		Gain	Loss		Gain	Loss		G	Loss
May 10, 1904..........	1	1	15.6	15.5	....	.1	14.	....	1.6	14.5	....	1.1	16.	.4	....	15.	....	.6
May 10, 1904..........	2	2	36.5	32.	....	4.5	25.	....	11.5	26.	....	10.5	30.	6.5	....	28.2	....	7.3
May 10, 1904..........	3	3	12.4	13.	.6	....	12.	....	.4	12.	....	.4	13.	1.3	....	12.7	.3	....
May 10, 1904..........	4	4	12.5	8.5	....	4.	7.5	....	5.	9.5	....	3.	9.2	....	3.2	8.7	....	3.8
May 10, 1904..........	5	5	27.1	24.	....	3.1	17.	....	10.1	16.	....	11.1	21.	....	6.1	19.5	....	7.6
May 10, 1904..........	6	6	17.7	16.7	....	1.	13.	....	4.7	16.5	....	1.2	16.2	....	1.5	15.6	....	2.1
May 10, 1904..........	7	7	8.5	7.5	....	1.	8.	....	.5	8.2	....	.2	9.	.5	....	8.2	....	.3
May 10, 1904..........	8	8	17.	17.	....	....	17.2	.2	....	17.2	.2	....	17.2	.2	....	17.2	.2	....
May 10, 1904..........	9	9	21.2	19.5	....	1.7	19.5	....	1.7	19.7	....	1.5	20.2	....	1.	19.7	....	1.5
May 10, 1904..........	10	10	16.	15.	....	1.	14.	....	2.	14.2	....	1.7	14.7	....	1.2	14.5	....	1.5
May 10, 1904..........	11	11	6.	5.	....	1.	4.2	....	1.7	5.2	....	.7	4.7	....	1.2	4.8	....	1.2
May 10, 1904..........	12	12	8.	6.5	....	1.5	5.	....	3.	6.	....	2.	6.	....	2.	5.9	....	2.1
May 10, 1904..........	13	13	1.7	2.	.3	....	2.	.3	....	2.	.3	....	2.	.3	....	2.	.3	....
May 10, 1904..........	14	14	19.5	17.2	....	2.3	17.2	....	2.3	18.	....	1.5	18.7	....	.8	17.8	....	1.7
May 10, 1904..........	15	15	15.4	15.	....	.4	12.5	....	2.9	16.5	1.1	....	14.5	....	1.1	14.4	....	1.
May 10, 1904..........	16	16	18.7	14.	....	4.7	11.5	....	7.2	19.5	1.2	....	19.7	1.5	....	16.2	....	2.5
May 10, 1904..........	17	17	24.	20.2	....	4.7	15.5	....	8.5	18.2	....	5.7	21.	....	3.	18.7	....	5.3
May 10, 1904..........	18	18	20.	17.7	....	2.3	14.5	....	5.5	18.5	....	1.5	15.7	....	5.3	16.6	....	3.4
May 10, 1904..........	19	19	16.4	14.5	....	1.9	13.	....	3.4	12.5	....	3.9	14.	....	2.4	13.7	....	2.7
May 10, 1904..........	20	20	20.	16.5	....	3.5	9.	....	11.	14.5	....	5.5	16.	....	4.	14.	....	6.
May 10, 1904..........	21	21	18.8	12.	....	6.8	10.	....	8.8	16.5	....	2.3	17.5	....	1.3	14.	....	4.8
May 10, 1904..........	22	22	18.7	18.5	....	.2	17.	....	1.7	18.2	....	.5	19.	.3	....	18.2	....	.5
May 10, 1904..........	23	23	25.6	24.5	....	1.1	20.2	....	5.4	25.	....	.6	25.	....	.6	23.7	....	1.9

May 10, 1904..........	24	24	14.5	7.	....	7.5	9.5	....	5.	10.5	....	4.	12.5	....	2.	9.9	....	4.6
May 10, 1904	25	25	17.8	17.	....	.8	14.	....	3.8	15.	....	2.8	15.2	....	2.6	15.3	....	2.5
May 10, 1904..........	26	26	25.2	23.	....	2.2	18.5	....	6.7	22.7	....	2.5	23.	....	2.2	21.8	....	3.4
May 10, 1904..........	27	27	27.8	27.5	....	.3	26.	....	1.8	26.	....	1.8	29.	1.2	....	27.1	....	.7
May 10, 1904..........	28	28	35.6	31.5	....	4.1	29.	....	6.6	36.	.4	....	37.	1.4	....	33.4	....	2.2
May 3, 1906...........	1	29	29.2	25.8	....	3.4	25.8	....	3.4	27.8	....	1.4	25.9	....	3.3	26.3	....	2.9
May 3, 1906...........	2	30	34.9	27.5	....	7.4	31.	....	3.9	32.	....	2.9	31.8	....	3.1	33.	....	1.9
May 3, 1906...........	3	31	31.8	31.2	....	.6	34.6	2.8	....	33.3	1.5	....	33.3	1.5	....	33.1	1.3	....
May 3, 1906...........	4	32	17.2	15.1	....	2.1	16.		1.2	16.3	....	.9	15.7	....	1.5	15.7	....	1.5
May 3, 1906...........	5	33	5.2	4.	....	1.2	4.6	....	.6	4.	....	.8	00.	....	....	4.2	....	1.
May 3, 1906...........	6	34	23.6	19.4	....	4.2	18.6	....	5.	20.4	....	3.2	20.8	....	2.8	19.	....	4.6
May 3, 1906...........	7	35	14.5	13.8	....	.7	13.2	....	1.3	12.9	....	1.6	14.3	....	.2	13.5	....	1.
May 3, 1906...........	8	36	17.3	14.	....	3.3	12.4	....	4.9	13.9	....	3.4	14.4	....	2.9	13.6	....	3.7
May 3, 1906...........	9	37	31.5	26.7	....	4.8	29.6	....	1.9	30.8	....	.7	29.6	....	1.9	29.1	....	2.4
May 3, 1906...........	10	38	11.7	12.4	.7	....	11.6	....	.1	11.8	.1	....	11.7	....	....	11.8	.1	....
May 3, 1906...........	11	39	16.6	14.5	....	2.1	15.8	....	.8	16.1	....	.5	15.2	....	1.4	15.4	....	1.2
May 3, 1906...........	12	40	14.2	10.	....	4.2	10.	....	4.2	9.2	....	6.	10.5	....	3.7	13.2	....	1.
May 3, 1906...........	13	41	23.8	21.	....	2.8	22.4	....	1.4	21.7	....	2.1	23.2	....	.6	22.	....	1.8
May 3, 1906...........	14	42	13.6	12.6	....	1.	13.4	....	.2	12.9	....	.7	14.	.4	....	13.2	....	.4
May 3, 1906...........	15	43	5.1	3.7	....	1.4	3.2	....	1.9	4.	....	1.1	0.	....	....	3.6	....	1.5
September 24, 1906	1	44	21.3	21.	....	.3	9.	....	12.3	23.	1.7	....	25.	3.7	....	19.5	....	1.8
September 24, 1906	2	45	29.4	29.6	.2	....	26.9	....	2.5	30.2	.8	....	33.8	4.4	....	30.1	.7	....
September 24, 1906	3	46	18.7	21.7	3.	....	11.5	....	7.2	23.2	4.5	....	24.5	4.2	....	20.2	1.5	....
September 24, 1906	4	47	27.2	26.	....	1.2	19.	....	8.2	30.2	3.	....	31.3	4.1	....	26.6	....	.6
September 24, 1906	5	48	27.3	24.7	....	2.6	14.5	....	12.8	27.5	.2	....	32.2	5.1	....	24.8	....	2.5
					4.8	105.0		3.3	196.6		15.0	91.3		37.0	62.9		4.4	101.0

DISCUSSION.

Dr. Moore: I have been very much interested in this paper, and there are one or two questions that I would like to ask Dr. Gilliland. It appears that in their operations the variation of the milk yield of the cows that did not react was not greater than the milk variation in a great many cows under ordinary conditions. I would simply like to ask how those results compare with a similar number, or how many checked or controlled animals have been used in order to compare the difference in the variation between those who received the tuberculin and did not react and those that did not receive it at all.

Dr. Gilliland: In answer to Dr. Moore, my personal opinion is that the difference in the cows that received the tuberculin and did not react is not any more variable than the table made from cows that received no tuberculin. I have no table of five hundred cows that received no tuberculin, but I believe that the variation would be as great as those that received tuberculin and did not react.

Dr. Moore: I agree with that, but I think that the conclusion should be incorporated in the paper. I have had some experience with dairymen in the action of tuberculin, and I am afraid unless that opinion is incorporated in the paper it will lead to the conclusion that this variation in the quantity of milk was due to the tuberculin. I am afraid of that. I would like to ask for the benefit of the members of the profession that Dr. Gilliland include that opinion in his paper so that whoever reads the paper will understand that you do not think that this slight variation is due to the result of tuberculin. I would like to ask one other question, whether you have arrived at any conclusion as to the effect of the reduction of milk in an animal that did react other than that produced by the temperature.

Dr. Gilliland: In answer to Dr. Moore's first question, my own personal belief is just what I say, and I would be very glad to incorporate it in the paper. I thought I would allow the gentlemen of the meeting to draw their own conclusion. The difference between the loss and gain was so small, there being only .600 of a pound of milk, that it must seem apparent to a dairyman that even though a few of them did gain the ones that gained made up the loss. I would be very glad, if you feel that it would be important, to incorporate it in the paper.

In regard to the other question, of the cause of the decrease in the reacting cows, I do not believe that it would be caused by anything else than fever alone. I believe that fever reaction is what decreases the milk yield.

REMINISCENCES OF BOVINE TUBERCULOSIS IN MASSACHUSETTS.

By J. F. WINCHESTER,
Lawrence, Mass.

When our Secretary, early in the year, wrote me that I had promised to prepare a paper on tuberculosis for this meeting, it seemed paradoxical that a practitioner should assume such an undertaking.

To keep my word, however, I have compiled what may be of interest, if not instructive, and the subject chosen is "Reminiscences of Bovine Tuberculosis in Massachusetts."

It is two decades since I wrote, as a member of the Cattle Commission of Massachusetts, a minority report on this subject.

At that time I had examined 886 bovines on thirty-four farms, and had made autopsies on 243 which confirmed the existence of tuberculosis in 28 per cent.

In addition to those killed, there were 189 cattle that were suspects.

Besides these I had examined 244 head on fifteen farms, and 28 presented evidence of the disease, or 11 per cent., also 24 suspects, but none were killed to demonstrate the existence of the malady.

Having demonstrated the existence of the disease, to prepare myself for the criticisms to be met, I had translated for me the Æteology of Tuberculosis by Koch; by Rev. Sauri, of Lawrence, Mass.

The public was not educated at that time to the existence of the malady in cattle, and as regards the health of mankind but little thought had been given to, or interest taken in the possible transmission of the disease to human beings.

This disease was not listed amongst the contagious diseases, but it was being suspected by the leaders of the profession as a contagious disease.

The first official intimation of the existence of tuberculosis in Massachusetts was made at the meeting of the State Board of Agriculture, November 29, 1886, when I said, "We certainly have what many consider a contagious disease in this State, and no formal notice is taken of it; I refer to tuberculosis.

"It is one of the most insidious and hardest of all diseases to recognize, and the situation requires some action on the part of the Board of Agriculture. It is a hereditary disease and you can trace it from generation to generation.

"There is also no doubt about its transmissibility by the material which is thrown off from the lungs."

My remarks were followed by the Chairman of the Board of Cattle Commissioners, Hon. Levi Stockbridge, who said, "There has been a long and somewhat acrimonious dispute in relation to it (tuberculosis), and the consequence has been that the Cattle Commissioners have never recognized it or treated it as a contagious disease."

This meeting was presided over by Hon. John E. Russell, Secretary of the State Board of Agriculture, and he made the following remarks:

"In regard to the matter upon which Dr. Winchester and Prof. Stockbridge have spoken, that is, the matter of tuberculosis, I do not know why they should bring that matter before us. If tuberculosis is contagious, they can act under the contagious disease law."

The next time this subject was officially and publicly taken notice of was in Springfield, Mass., December 1, 1887.

The subject of tuberculosis was being discussed and I was called upon, and made the assertion that at least 25 per cent. of the herds in Eastern Massachusetts are infected with tuberculosis. I was immediately followed by a member of the Board of Agriculture, who said, "I am unwilling to have the statement go out to the public that one-fourth of our cattle in any part of our State have this disease."

I attended one more meeting of the State Board of Agriculture but the subject of tuberculosis was not considered.

Subsequent to my suggestion November 29, 1886, that there exists in this State what is considered a contagious disease, the Trustees of the Massachusetts Society for promoting Agriculture, in the spring of 1887, decided to establish an experiment station at Forest Hills, in Boston, to study the dangers to human life and health arising from the food and products of cattle.

"Attention had been publicly called to this subject, and the Trustees decided that it would be of value to both producer and consumers to have those dangers investigated.

"These results were reached in the autumn of 1890 and were reported to the Legislature in 1891 on January 13 by petitions asking for legislation to secure an inspection of the cattle in Massachusetts.

" It was not until June 11 that a resolve was passed, but with an appropriation much less than was recommended, and so small as to negative the purpose of the resolve."

This quotation is the preface of the work done under the auspices of the Massachusetts Society for promoting Agriculture upon the infectiousness of milk from tuberculous cows with no lesion of the udder, by Dr. H. C. Ernst, under date November, 1894.

The conclusions of Dr. H. C. Ernst, derived from his investigations from spring of 1887 until fall of 1890, were that bovine tuberculosis is quite a common disease, particularly among the dairy herds of the East, and that the time is not far distant when action must be taken to prevent its spread among cattle, as well as to protect consumers from the use of tuberculous beef and dairy products.

It seemed to him that he had presented sufficient evidence to warrant certain definite conclusions as follows:

1st. While the transmission of tuberculosis by milk, is probably not the most important means by which the disease is propagated, it is something to be guarded against most carefully.

2d. The possibility of milk from tuberculous udders containing the infectious element is undeniable.

3d. With the evidence here presented, it is equally undeniable that milk from diseased cows, with no appreciable lesion of the udder, may, and not unfrequently does, contain the bacillus of the disease.

4th. Therefore all such milk should be condemned for food.

The next official recognition of the malady was by the Cattle Commission under date of May 12, 1890, when they issued a circular calling attention to the disease, the beginning of which is as follows: " Tuberculosis is a word that is not found even in the latest edition of Webster's Unabridged Dictionary." This was signed by the Secretary.

The Board under same date issued a regulation calling the attention of the Boards of Health of the State to tuberculous cattle, with instructions.

The report of the Cattle Commission for the year 1891 makes use of a report made by Dr. A. W. Burr, of Boston Board of

Health, and Dr. Williamson Bryden, the inspector of cattle for export, which are very optimistic, and they ask the question, "Can these statements of Drs. Bryden and Burr be disproved by Dr. Bailey of Maine, and Dr. J. F. Winchester, of Lawrence, Mass.?"

The personnel of the Board was changed May 12, 1892, when two veterinarians with Hon. Levi Stockbridge comprised the Board.

This year the Legislature passed a law requiring the cities and towns to appoint inspectors of animals. An act also passed to more effectually prevent the spread of tuberculosis.

The Cattle Commissioners were requested, in June, 1893, to define the duties of inspectors of animals intended for slaughter or kept for the production of milk, issued instructions.

Amongst them was one for a thorough examination every three months. When tuberculosis is found the animal shall be isolated, the milk shall not be sold, and if killed by order of the Board of Health, no compensation will be allowed by the State.

The next year, 1894, the Board was increased to five (5), and the law was changed by approval of the Governor, June 20, 1894.

Prior to September 1, 1894, all opinions were based on the physical examinations, and were far from satisfactory.

The Board became satisfied September 20, 1894, that the use of tuberculin was a reliable method to detect the disease.

By a unanimous vote, October 4, 1894, the following system of action was adopted:

1st. The test, with tuberculin, of all suspected cases reported by the local inspectors.

2d. The regulation of the importation of all meat stock into this State, from all points without its limit.

3d. The quarantining of all such imported animals until tested with tuberculin, and either condemned or certified as sound.

4th. The establishing of regular quarantine stations for foreign cattle.

5th. The forbidding of the importation of all meat stock unless delivered to the quarantine stations.

6th. The branding of all animals that successfully passed the test.

7th. A systematic examination of all animals within the State by the use of tuberculin, beginning with the counties of Nantucket, Dukes and Barnstable.

This policy was first announced October 25, and November 20 orders and regulations were issued to take effect November 25.

As you will see, the policy of the Board previous to June, 1894, was to condemn cattle by a physical examination, but that month the Legislature adopted a bill that gave the Commission almost unlimited power.

The first difficulty that was met with was the results obtained by testing those animals at the stock yards market at Brighton, and is well described in this report. These cattle are collected from different localities, and brought together for the first time.

They have been put into crowded cars, have suffered the excitement attending an unusual journey, have probably received their food and water at irregular periods, and in every possible way have been subjected to conditions utterly foreign to their ordinary existence. They are in all stages of gestation which interferes with their nervous sensibilities, and actually has a direct effect on their internal temperature.

The appropriation for this work, $100,000 by the Legislature and $50,000 allowed by the Governor, was expended during the year 1894, and 5394 cattle were examined; some idea of the cost may be found if the work was to be conducted along the lines laid down that fall.

In January, 1895, having expended their appropriation, the Commission applied for a largely increased appropriation, with increased powers to carry on the work begun in November, 1894.

At the hearing in February, 1895, the Commissioners referred to the eradication of contagious pleuro-pneumonia, which had been successful, and those methods would be equally successful with tuberculosis. It was then that the opponents to the work of the Cattle Commission scored, and the appropriation was cut to $100,000 and restricting the use of tuberculin to such cases as were thought to be diseased on physical examination.

In consequence of the appropriation, and the restrictions on the use of tuberculin, this bill did not meet with the approval of the supporters of the Commissioners, and efforts were made to have the Governor veto the measure. The bill was submitted to the Attorney-General for his opinion; without quoting the entire opinion it will perhaps be of interest to note this: "It may well be assumed that a carcass which is infected or an animal which is infected with tuberculosis has practically no value for meat or milk purposes."

By an order dated March 25, 1895, the inspectors of the various towns and cities were ordered to make one examination each year, to commence in October and to be completed by December 15.

Inspection was allowed at any time, when, in the opinion of the inspector it was required.

The order issued April 9, 1895, the inspectors were ordered to discontinue their work until further notice, since the temporary appropriation made by the Legislature had nearly run out.

Compensation was allowed for the animal slaughtered without taking into consideration the existence of the disease at her food or milk value under the law of 1894, but by the acts of 1895 that was repealed and the law required the value of the animal at its actual value at the time of condemnation.

Tuberculin was used by request of owners, and it was not necessary for the Government to pay for the work since many were anxious to rid their herds, and they willingly would allow $2.00 per head for the testing, when the State would compensate them to a degree for their loss.

The use of tuberculin ceased at the stock yards July 8, 1895, when the order was issued permitting the importation of cattle into the State that had a tuberculin certificate, signed by one acceptable to the Board, and each animal tagged in the ear and numbered to correspond to the certificate. Should any animal come from out of the State without the certificate the test must be made.

In February, 1896, the Board issued an order to stop all work until further notice, in order to stop further expense.

The order for the fall inspection dated September 30, 1897, the inspectors are directed to make a thorough examination of all barns and report the same.

The work of the Board was investigated by the Legislature of this year and the use of tuberculin by request was forbidden.

The personnel of the Board again changed in the fall of this year but the number remained the same.

The general work for the year 1897 was the same as 1896.

The inspections by the local inspectors are changed from fall to spring by the order issued March 9, to be finished on or before May.

There was a notice issued May 12, and in referring to cattle from out of State, which have not already been tested with tuberculin in a manner satisfactory to the Board, are to be held in quarantine at the expense of the owner until tested with tuberculin at his expense by a veterinarian acceptable to this Board.

There were tested 9991 State cattle, of which 5425 were condemned and paid for at an average of $34.12.

The expense for this year to the State was $240,737.84, while the receipts from the Board for hides, etc., were $5,217.23.

The ratio of the animals condemned by the tuberculin test for the year 1895 was 53.4 per cent. (4484 tested), for 1896 was 59 per cent. (7062 tested), and for 1897 was 51.43 per cent. (9844 tested).

I am unable to find a record of the flesh of any condemned cattle being passed for food during this period.

The law of the State is, that any person who has good reason to suspect the existence of any contagious disease among any species of domesticated animals, no matter how obtained, shall report to the Board.

When the appropriation for this year was granted, notices of reacting animals came in fast, and under the law the only thing to be done was to accept the test or retest; this later was often found to be unsatisfactory, because of the frequent failures of animals to react to a second test.

The result was that to a large extent the control of the appropriation was taken out of the hands of the Board.

At that time a sum not exceeding $60.00 for any one animal was the compensation.

In April the Board called attention to the law relative to any wilful act or neglect to cause the spread of the disease and all persons are requested to notify the Board as regards what steps are being taken to disinfect, and the date when such work was completed. Agents were sent out to inspect the work of disinfection.

In the mean time, on account of the amount of private testing, a committee of the Legislature made a report recommending that all testing of cattle with tuberculin, when compensation is expected, be limited to the Cattle Commission or their authorized agents.

The Board had expended $160,000 of the $250,000 appropriated earlier in the season, and at this rate the Board would be without money for its regular work or the slaughter of those animals reported by the local inspectors as suspicious cases, and which are really the most dangerous animals to the health and comfort of the general public.

As a result of the report the Legislature passed an act forbidding the compensation by the State for reacting animals unless done by the Cattle Commissioners or their agents.

January 1, 1898, the Board issued a notice that it has been decided to consider those testing cattle with tuberculin, to be brought into this State, as our agents outside of this State, and the Board will only accept the tests of such men as we approve of.

All tests to be made at the expense of the owner or buyer. All animals to be tagged, the tag to be furnished by this Board at cost, and the number on tag to correspond with the certificate. Under the same date the dealers were sent a letter advising them they could obtain a printed list of the men the Board considered reliable, and that the list was subject to revision at any time.

At the beginning of 1898 the Legislature appropriated $20,000 for carrying on the work until a further appropriation could be made, and from that time until April the work was carried on as in 1897.

The Legislature adjourned without having made any further appropriation. At the request of the Board the Attorney-General said in part the Board could not contract any bills. The Board decided to keep up the quarantine of out-of-state cattle, and continue its work except in so far as it related to the condemnation of animals affected with bovine tuberculosis.

A general per cent. of all herds tested in Massachusetts would include 7480 animals; of these 2600 or 34.75 per cent. were found to be infected. Probably 75 or 80 per cent. of these cases are slight, localized cases, but it is no use hiding the fact that these animals are infected animals.

The Legislature of 1899 considered that three (3) Commissioners would be a more convenient number than five, as it has been since 1894, and that a smaller Board could administer the law more economically.

The Legislature allowed $75,000 this year, but it was found possible to administer the law at an expense of about half this amount. The Board asked that $50,000 be placed at its disposal another year as sufficient; the limit for any one bovine was not to exceed $40. The average was $22.50.

This Board has been hampered, and impeded and imposed upon, in every possible way by avaricious cattle traders, and dishonest veterinarians, who disgrace what ought to be an honorable profession by making out imaginary certificates of tests upon animals.

During the year 1900 there were released at the three quarantine stations 17,043 cattle; 633 were tested and 7 condemned after the test. The greatest obstacle to the enforcement of laws or regulations requiring a tuberculin test in the interstate cattle traffic is dishonesty, first, among cattle dealers and drovers, second, the dishonesty of certain veterinarians.

As to the dangers to the public health I (Chairman of the Cattle Commission) think that is a matter that has been overestimated. Much of the trouble seems to be due to a lack of honesty among certain dishonorable members of the profession.

An order issued October 1, 1900, by the Board, in part reads: " Cattle are not to be quarantined as tuberculous unless they show enough evidence of disease to make it possible to condemn them on a physical examination, except where the udders of a milch cow are tuberculous."

The tuberculin certificate for out-of-state cattle was accepted during 1901, and animals that have not been tested are held and tested by the Cattle Commission; any that fail to pass the test are held for a week and retested. If an animal reacts a second time, it is deemed to be tuberculous and is killed.

Formerly all animals that reacted the first time were killed, but some that gave an apparent reaction on the first test were found free from disease post-mortem and the State had to pay for them.

Under the present system a creature that reacts to the second test is invariably found to be tuberculous on autopsy.

The Board of Cattle Commissioners was abolished April 15, 1902, and the Cattle Bureau of the State Board of Agriculture was created by the Legislature, which consists of one individual known as Chief.

From this time the work at the Stock Yards remains under the direction of an agent of the Cattle Bureau, who had been one of the Cattle Commissioners. Owing to the unsatisfactory manner in which animals brought into the State were tested, an order was issued which took effect September 30, 1902, providing that all cattle brought into the State that require testing shall be tested by the agent of the Cattle Bureau and his assistants.

The cattle that arrive Tuesday A.M. and those to be retested are tested Tuesday and Wednesday in season to have the test completed at 10 A.M. Wednesday.

Any that appear to react, are held over, and tested the next week. If an animal reacts a second time, it is either killed or the owner returns it to the State it came from, if he can get permit.

During the last half of the year from July 22, 1903, at Brighton, there were 126 cattle that reacted out of 6707 tested, and 79, or 63 per cent., at the retest, the balance 47, or 37 per cent., were released.

Of the 79 condemned, 28, or 35.44 per cent., were so badly diseased as to have to be rendered. The owners received the returns for beef from 46, or 58.2 per cent., and the State paid for 5, or 6.3 per cent., which were found free from disease.

By request, 438 were tested and 248, or 56.62 per cent., reacted. Of that number 153 were rendered, or 61.69 per cent., and 95, or 38.34 per cent., condemned; no award allowed.

From December 15, 1903, to December 15, 1904, 12,506 cattle were tested and 145 condemned after retest, or 1.16 per cent.; numbers of reactors not given. Nine of that number were found not diseased. Milch cows belonging in the State and sold at Brighton are not tested, for should they react the State must pay for them. The voluntary work for this period consisted in the testing of 359 cattle in 20 herds and 105, or 29 per cent., reacted. Of that number 40.9 per cent. were tanked, 56.19 per cent. were used for beef and the State paid for 2.85 per cent. that were not diseased.

For the year ending December 15, 1905, there were tested at Brighton 13,833 cattle, and 95 were condemned after a retest, and 15 the owners did not care to wait for a retest. The number of reactors is not given. The voluntary work consisted in the testing of 180 cattle and 90 reactors; of that number 50 were tanked and 40 sold for beef.

For the year ending November 30, 1906, there were tested at Brighton, 13,262 cattle. There were condemned after a retest 183, or 1.37 per cent., and of that number 102, or 55.3 per cent., were sold for beef and 81, or 43.93 per cent., were tanked. Numbers of reactors not stated.

By request 400 head were tested with tuberculin and 25.50 per cent. reacted, 59 per cent. tanked while 40.57 per cent. were used for food. It may be interesting at this point to refer to

Bulletin No. 27, Hatch Experiment Station of Massachusetts Agricultural College, written by Dr. J. B. Paige, under date of December, 1894. The first reference of tuberculosis among the cattle on the college farm is the report of the farm Superintendent of 1873, when attention was called to the death of one cow. From this year to 1890 there were occasional deaths. Prof. Brooks, under date of January 3, 1893, says, "In spite of our attempts to disinfect our barn, it appears to be thoroughly infected with the germs of tuberculosis.

"When I assumed responsibility for the management of the college farm in 1889, I found two animals in the barn affected with tuberculosis. They were slaughtered and matters were allowed to run until the winter of 1890. Becoming somewhat alarmed, in view of the statement of certain veterinarians as to the condition of the herd at this time, Dr. James Law was called in. He made a thorough examination of every animal in the herd, and sent in a report which was quite reassuring in its character. Two animals slaughtered by his advice were found diseased, and, acting upon his suggestion as to disinfection and ventilation, no further trouble was experienced until the winter of 1890–1891, when 9 animals were killed."

Beginning in October, 1892, and continued to June, 1894, Dr. J. B. Paige used tuberculin with the result that in June, 1894, 32 animals in the herd of 52 were killed.

The autopsy revealed the fact that only in 7 cases the disease was not found.

At the meeting of the Massachusetts Veterinary Association in March, 1907, it was recorded that sealed cows suspected of being tuberculous or reactors were allowed to be kept in herds of cows that supply milk for the local market until they were retested the following week.

It was also recorded that those animals that were condemned by the officials of the State of Massachusetts at Brighton were sent to the slaughter under U. S. inspection and the fiat of the U. S. Inspector the carcass was either tanked or sold for beef.

As a result of these facts, I drew up the following resolutions, which were presented at the April meeting:

WHEREAS, It has been proved that tuberculosis from the bovine has been transmitted to the human subject;

WHEREAS, It has been proved that the ingestion of the bovine tubercular bacillus has caused tuberculosis in man;

WHEREAS, It has been universally recognized that the tuberculin test is the most nearly positive means for detecting the existence of tuberculosis in bovines;

Be it Resolved, That the Massachusetts Veterinary Association recognize bovine and human tuberculosis as identical, and inter-communicable, and the products of tuberculous animals unfit for human food.

And be it further Resolved, That the Massachusetts Veterinary Association recognize a reaction from the tuberculin test as positive evidence of the existence of tuberculosis.

STABLE VENTILATION FROM A CLINICAL STANDPOINT.

By G. A. JOHNSON, D.V.M.,
Sioux City, Iowa.

Mr. President and Members: After having received and read the program of this meeting, I began to appreciate the fact that I would be trespassing very much upon your good nature in taking up your time that could be so profitably utilized in considering the good things that have been prepared for you.

I have no new facts to offer and, so far as I have been able to ascertain, the science of stable ventilation has made very little progress during recent years.

However, having promised to prepare a paper for this meeting, I will briefly call to your attention some of the old and well-established facts relative to stable ventilation, or more properly speaking, the lack of ventilation, especially in our northern climates, with the view of opening a discussion of some startling theories that have recently been advanced.

When we take into consideration the fact that not only the country's prosperity but, by reason of the vast quantities of meats and milk that are used, the health of her people, are influenced to a greater or lesser degree, by the health and thrift of her live stock, it becomes apparent that any condition that jeopardizes the health of our live stock should be of great interest to all.

With these facts before us and the fact that it is generally agreed by veterinarians, especially those in practice, and most authorities that the sanitary condition of the stable has much to do with the prevalence of disease among the animals confined therein, it must be admitted that stable ventilation is a very important problem.

Probably every practicing veterinarian can recall many instances of being called to attend a patient that was confined in a stable where the atmosphere was so impregnated with foul smelling and irritating gases that it materially interfered with his respiration for some time; and that patients confined in such stables that did not, at first, present any serious conditions, instead of responding to treatment, grew worse more or less rapidly and frequently terminated fatally.

On the other hand, some may say that we encounter just such cases in the best of ventilated stables. This is true, but the percentage is the larger the poorer the ventilation, other conditions being similar.

Again, patients that were gradually growing worse under these bad hygienic conditions often make a rapid recovery when placed under more favorable conditions.

And these facts can be explained upon physiological principles. All of these fetid, irritating gases arise from waste products that have been eliminated from the animal system in the form of gaseous, fluid, or solid excrement.

To be sure, these excrements may, and probably do, undergo changes and form new compounds after leaving the system; but it is a fundamental principle of organic life that it cannot subsist long upon its own excrement, and even small quantities of such products have a more or less detrimental action upon the animal organism if continued for any considerable length of time.

Therefore, from a physiological standpoint, we should expect that these foul gases, arising from the excrement of the animals in unventilated stables, would reduce the vitality and predispose the animal to disease, and the experience of ages has demonstrated that this is a fundamental law of nature.

I do not wish to be understood as taking the position that the hygienic condition of most stables is so bad that it becomes an exciting cause of disease, but I do most assuredly believe that it is a predisposing factor and that the confinement of a number of animals in a poorly ventilated stable, or rather one with no ventilation in the true sense, not only has a tendency to weaken their vitality, thereby rendering them more susceptible to disease, but also materially facilitates the transmission of pathogenic microörganisms from one animal to another.

To illustrate, we all know that strangles spreads much more rapidly and the percentage of fatalities is much greater in horses that are confined in stables that are poorly ventilated, than among horses that are confined in well-ventilated stables; and it is a fact conceded by all that tuberculosis spreads much more rapidly, and runs a more rapid course, the poorer the ventilation of the stables where the cattle are confined.

On the other hand, it can hardly be assumed that an occasional confinement of the stock in a very badly ventilated stable is as dangerous as continual confinement in a moderately well ventilated stable.

Probably no better illustration of this principal can be found than a comparison of the health of our range cattle with that of the pure-bred herds of our breeding establishments.

Tuberculosis is very rare among range cattle and very prevalent among the pure-bred herds; even the bulls that are taken from the infected pure-bred herds of the East and kept on the range for a few years rarely show tuberculosis upon slaughter; while dairy cows, that are closely confined in poorly ventilated stables, show a very large percentage of tuberculosis.

But aside from the prevalence of disease, we have very little knowledge of the effect of close confinement of cattle in unventilated stables, but a number of practicing veterinarians have advanced the theory that horses that are confined in poorly ventilated stables cannot endure as much work as horses that are kept in better ventilated stables, which is further evidence that poor ventilation weakens the vitality of the confined animals.

Many more similar instances could be cited, but I trust that this will suffice to illustrate the principle.

But, notwithstanding all of the facts that go to demonstrate the importance of good ventilation, we find the ordinary stock owner laboring under the delusion that a stable that is built so as to retain all of the animal heat (which means without ventilation) is most humane as well as economical, and, therefore, the tighter the stable can be built the better it suits him. But, so far as I have been able to ascertain, no veterinary authority has had the temerity to sanction this theory until the veterinarian to the Minnesota State Experiment Station recorded his investigations of stable ventilation in a paper presented to this Association at its Forty-Second Annual Meeting, and later in Bulletin No. 98 of the Minnesota State Experiment Station.

This theory is so at variance with all previous teachings and the observations of all practical men from time immemorial, that we are justified in making a very careful analysis of the original work done before accepting the theory.

While the paper and the bulletin purport to be a record of the same series of investigations, some points appear to be so much more prominently set forth in the bulletin and because it was distributed directly to the stock owners, it will be more to the point to use the bulletin as a basis for our study of the theory.

The portions that are particularly worthy of attention are: firstly, the scope of the investigation; secondly, the results obtained; and thirdly, the interpretation of the results.

In order to fully understand the scope of the investigation, it is essential that we understand what was actually done, and this, briefly stated, consisted in the confinement of one bullock at a time, for various periods, in a box-stall 9 feet wide by 10 feet 8 inches long and 8 feet 2 inches high, especially arranged so as to prevent as much as practicable, any change of the air within the stall; secondly, in making from time to time a chemical analysis of the air and urine and blood counts of the confined animal; and thirdly, in observing the animal for clinical symptoms of disease or other evidence of the bad effects of the foul air.

In order to determine, experimentally, what would be the results of confining animals in stables having poor or no ventilation, it is absolutely indispensible to reliability that the animals used in the investigation should be kept under conditions more or less similar to those found in the ordinary stable.

But, as will be noted, the animals studied in this case were kept under entirely different conditions from those that prevail in most stables, for it is absolutely impossible to produce the same or even similar conditions with one animal confined in a box-stall that are found in stables where several animals are confined, because the item of contagion is practically eliminated; and the fact that the stall used was provided with a cement floor and sewer connections makes a very different condition from that of the ordinary stable that is provided with a plank or dirt floor without sewer connections, and more especially if the stable has been used four or five years or longer.

Again the length of time that the animal was confined (thirty-seven days being the longest period) cannot reasonably be compared with that of four or five months, or even longer, as is frequently the case in our colder climates, especially in dairy stables.

Therefore, it would appear that the results of the investigations under consideration are practically valueless and misleading as far as pertaining to or bearing upon practical stable ventilation, because the conditions under which they were carried out differ so materially from those prevailing in most stables.

On the other hand, a study of the chemical analysis of the air of the stall demonstrates that CO_2—carbonic dioxide gas—is not so acutely poisonous as the older authorities have maintained or that cattle "acquire a very high degree of tolerance" for it.

For the clinical observation, the blood counts and urine analysis revealed the fact that the confined animal remained apparently healthy in an atmosphere that had a very high content of this gas.

While much credit is due the investigator for the painstaking manner in which this tedious and exacting work was carried out, it will be noted that the investigations consist very largely, if not wholly, in a study of the percentages of CO_2 in the air of the stall and its immediate effect upon the confined animal.

No new facts were developed that may be considered as proving or disproving the theory that confinement in foul air depresses the vital functions and materially reduces the natural resisting powers of the confined animals.

Therefore it has not been demonstrated that the investigations have any special bearing upon the problem of stable ventilation.

Briefly stated, the investigations as recorded in the bulletin, have demonstrated one fact, and one only, and that is that CO_2 is not so actively lethal for cattle as was formerly supposed.

But from this is advanced the theory that for practical purposes it is better, in our northern climates, to build the stables so as to retain the animal heat, than it is to build them so that the confined animals will be supplied with plenty of pure air; or, to quote from the bulletin, page 89, "To get anything like the amount of air demanded by most authorities is certainly impracticable. If less is compatible with the health and comfort of our confined stock, it is very important that we know it and be quite sure of it. If what we call moderately or even decidedly foul stable air is not commonly inimical to the health and comfort of those animals or the owner's profits, then it is of the utmost importance that we know this also."

No reasons are given why it is impracticable to get good ventilation in the colder climates, but the inference is that it is on account of the cold, which virtually means that warmth of the stable is of more importance than fresh air. And this thought is very prominently set forth all through the bulletin, as the following will illustrate. On page 90 we read: "The real problem with which we have to finally deal is how little air is compatible with normal health and comfort of the stock and with economic feeding;" and on page 98: "But the fundamental problem underlying all of this work is involved in an effort to determine the least amount of air change necessary to maintain the normal health and comfort of the confined animals. For the comfort of confined stock, economy of production, particularly with dairy stock, and for other reasons, it is important that no more air change in winter be induced than is really essential for health, comfort and profit." And under the heading "Summary," page 115, we read: "The real problem at issue in the present study is how little air is compatible with normal health and comfort of the stock and with economic feeding in northern climates during mid-winter. The question of stable ventilation during the summer season requires very little consideration." And on page 116, this proposition is still more specifically stated: "We wished to establish also, if possible, a range of permissible impurity above which contamination becomes distinctly harmful."

And the inference drawn is that it is doubtful if any ordinary stable is built sufficiently close to make it distinctly harmful, for it is stated (page 101): "It is scarcely possible to imagine a stable where more unsanitary conditions, according to accepted standards, are maintained than in this stall."

Yet the animal confined therein is reported to have remained apparently healthy, which would lead the reader to suppose that the same would hold good with the ordinary stable.

But, as a matter of fact, because these animals, which were confined one at a time in the box-stall for periods ranging from two to twenty-eight days, did not contract pneumonia, catarrhal fever, tuberculosis, or any other disease, does not, as the author assumes, demonstrate that disease is not more liable to appear when a number of animals are confined in a poorly ventilated stable during the entire winter, year after year, so long as the animal is kept on the premises, than would be the case if the stable were provided with good ventilation.

This phase of the problem is discussed in the bulletin as follows (page 112): "It has been shown that in the old stables of the Alfort Veterinary School, which were badly crowded and poorly ventilated, cases of pneumonia and severe wounds rapidly assumed a serious character and often terminated fatally." After the buildings were enlarged and the sanitary conditions improved, the losses reduced materially. It is also recognized that if almost any epizoötic occurs among horses, *e.g.*, pneumonia, glanders-farcy, or influenza, it is very much more fatal in badly ventilated stables than in stables where other conditions prevail." An oft-quoted example is one concerning the French cavalry wherein it appears as a matter of record that an actual mortality of 19 per cent. was reduced to less than 7 per cent. within a few years by merely increasing air space. Boston suffered a historic outbreak of influenza among horses in the late 50's and we are told that in those stables grouped as good, fair and bad, according to heat, light, dryness and ventilation, they gave a respective mortality in proportion of 1, 3, and 5.

Records of this character are dismissed by the author as follows: "We can easily accept a revised explanation of ventilation and regard these statements as very probable. We need only to revise the explanation." And on page 116: "Historical statements concerning the unwholesomeness of badly crowded and unventilated stables are conceded to be in the main correct as to actual facts, but the accepted explanation may be seriously questioned."

What revision of the explanation is to be made we are not told, but it is presumable that it would be that the diseases were due to pathogenic microörganisms rather than to the foul air, for it is stated on page 113: "That where animals confined in unventilated stables are injuriously affected, it is so because of lack of exercise, lack of sunshine, concentration of pathogenic microorganisms, and perhaps other factors not now understood."

But no explanation is made of the fact that pathogenic microorganisms caused the disease in each class of stables, but that the mortality differed according to the condition of ventilation.

Nor is any practical method of obviating the concentration of the pathogenic microörganisms suggested, although it is stated on page 113: "We may have a reasonable inference that a well-lighted but unventilated stable is superior from a sanitary standpoint to a supposedly well-ventilated but poorly-lighted one for the pathogenic microörganisms do not thrive in the sunshine."

Theoretically, this may be plausible, but it is utterly impracticable, for several reasons. First, the ordinary stock owner could not be induced to build his stable light enough to secure germicidal action; secondly, it would be too expensive to keep in repair, on account of breakage; thirdly, the glass would rarely be kept sufficiently clean to allow enough sunshine to penetrate the building to produce much deleterious action upon the microörganisms; and, fourthly, it would make the building so much colder that it would defeat the object of the closed stable,—*e.g.*, warmth.

From a practical standpoint, it does not make any difference whether it is the foul air, pathogenic microörganisms, or the close confinement that causes the disease, so long as it is impossible to separate the harmful from the harmless; and, while this condition exists, we must deal with them as a whole.

On the other hand, so far as has been demonstrated, the only practical way to prevent the concentration of pathogenic microorganisms in a stable is to supply a good circulation of pure air and as good a supply of light as it is practical to obtain; and this precludes the possibility of having a warm stable, during our winter months, unless artificial heat is used, which is not practicable.

And this brings up the question, Is a warm stable necessary, advisable or economical? Undoubtedly it is more comfortable for the confined animals: but some do not have warm stables, and cattle that are being fattened in this territory for slaughter are fed in the open and have only an open shed for protection, while further north and west, where the cold is just as great, if not greater, and the storms are just as severe, stock live and thrive upon a very scant ration with no stable protection whatsoever.

Therefore a warm stable cannot be considered a necessity.

When stock is kept in a warm stable, they become so chilled upon being turned out into the cold winter air they will rarely take more exercise than compelled to; therefore, it does not derive the benefit it should from being turned out; and, as all are aware, chilling not only predisposes to pneumonia, bronchitis, and other diseases, but it also interferes with the thrift of the animals. As a result of experience, most stock owners are aware of these facts, consequently the tendency is to confine the stock the more closely the warmer the stable.

Again, owing to the fact that it is practically impossible under present conditions to exclude pathogenic microörganisms from a stable, it can scarcely be considered good logic or advisable to even consider, to say nothing about advocating, any method of building stables or any system of ventilation that does not take this phase of the problem into consideration.

And, regarding the question of economy, when we take into consideration the fact that disease, especially pneumonia and tuberculosis, is the more prevalent the closer the confinement, it is an open question if the loss from disease does not amount to more than the gain in flesh; but when applied to dairy cows, the problem becomes more complicated, for it is generally conceded that cows yield more milk when warmly stabled. On the other hand, the milk of diseased cows should not be used for food and the question arises, will the increase in the yield more than balance the extra expense of keeping the herd free from disease or the loss of the milk of such cows as contract disease under the unfavorable conditions.

Therefore it does not appear to have been demonstrated that an unventilated stable is advisable or most economical.

Another point brought out in the bulletin is " What constitutes a condition of perfect health," and it is assumed that when an animal eats well, looks well, apparently feels well, and the excretory organs act normally, it is in perfect health.

Yet, when we take into consideration the fact that many animals that are quite extensively affected with tuberculosis exhibit exactly the same symptoms of health, it seems hardly permissible to accept this common definition of normal health, for it is certainly misleading in the case of tuberculosis; and it is the common acceptance of this definition that makes it so difficult to convince the ordinary person of the fact that cattle are tuberculous even when demonstrated post-mortem.

Having thus reviewed the work as given in the bulletin, let us briefly consider some of the conditions as they actually exist.

As a general proposition, tuberculosis is much more prevalent among stock the colder the climate of the country, other conditions being similar; and the only constantly associated factor is that the colder the climate the closer the stock is housed, which strongly indicates that the common methods of stabling has more or less to do with the prevalence of this disease.

During the past ten or twelve years that section of the country known as the Upper Mississippi and Middle Missouri River valleys has enjoyed great financial prosperity, and many of the stock owners have enlarged the old or built new stables, with the view of better protecting their stock from the winter weather with the result that tuberculosis has spread much more rapidly in this territory than in any other section of the country.

But notwithstanding these conditions and all the facts that go to demonstrate that ventilation is essential to the health and thrift of our live stock, this bulletin, which carries the weight of authority, though based upon a series of investigations that in reality cover only one phase of the problem, was distributed broadcast among stock owners of this section.

What the results will be no one can foresee, but it is safe to predict that but few practicing veterinarians could convince the ordinary stock owner, who has read or been told of this bulletin, that ventilation is essential or desirable.

But taking into consideration the very great importance and the unsettled condition of the problem of stable ventilation and the effort that this investigator has put forth, it would appear advisable for this Association to put itself upon record.

If, in the judgment of the Association, the original work done and the results obtained justify the conclusions put forth, and the interpretation that the average stock owner will put upon the bulletin, the investigator is entitled to the hearty commendation and moral support of the Association. On the other hand, if the investigator has not demonstrated the correctness of his position, the bulletin should be classed along with Prof. Koch's famous paper upon the relation of human and bovine tuberculosis. And this Association should go on record as not sustaining the author's position, and put forth its best efforts to counteract the harm that is likely to arise therefrom.

DISCUSSION.

Dr. Young: Dr. Johnson, I think, has given us a very practical paper on this subject, and one that must appeal to every veterinarian. I have seen a great many cases in my practice where the ventilation and general stable condition has been very much as he has described, ailments have prevailed, and where, by leaving the door open, the animals have recovered, showing that the animals had been absorbing air which had become impregnated with impurities, leading to the development of disease. I have found many cases of that, and I have no doubt other practitioners here have had similar experiences.

Dr. Moore: Mr. President, I wish to express my hearty accord with the treatment of the general subject matter of the paper, but there is one point to which the writer refers,—and whether I understood him or not, I am not quite certain, but if I did, I fear that it might leave a wrong impression. I think that it is true oftentimes upon the part of dairymen that there is a tendency to neglect a very vital and most important means of contaminating or infecting their herds under the disguise of ventilation. You will find in New York some of the most heavily infected herds are kept in modern well ventilated barns. We find also, on the ranges, particularly in certain localities, where the disease has been introduced with breeding animals, that tuberculosis is quite prevalent. It has been my privilege to examine cattle, and quite a number of them from the ranges in California and in Montana, and to see cattle slaughtered coming from those ranges where animals infected with the tuberculosis had been introduced, and from which the disease had spread. So I feel that we must not look upon ventilation as a panacea against the infection of this specific disease. Ventilation is very important, and I would not under-rate its importance in what has been said in regard to cattle diseases, and its general importance to the health of the animals, but as to these specific infectious diseases we are going to get them where their viruses are introduced, no matter what the ventilation is if the other conditions are favorable. And if the conditions are favorable such diseases are going to spread.

DR. QUITMAN: Mr. President, I do not wish to enlarge upon the subject any, because I think Dr. Johnson's paper is very apropos. In connection with this discussion, however, I may say that I believe that such a bulletin as was sent out from the Minnesota Station, treating upon this question, in my opinion, is a very dangerous one. It tends to upset and oppose the settled principles laid down in the field of medicine, for many, many years, of, I might say, hygiene. It is very liable to instill the idea into the stable owner's mind that any old kind of a stuffy stable is good enough for his cows, and good enough for his horses. In fact, they might well point to it as an authority on the subject to dispute any legislative action along those lines. I read portions of the bulletin, in fact, practically all of it, and the idea that was inculcated in one's mind was that animals allowed to be crowded and herded together in a poorly ventilated stable, inhaling or inspiring gases arising from decomposing matter in the stable, re-breathing the expired air, etc., were not, unless such conditions were extraordinary, injured. Well, that may work out all right experimentally, but the experimentor seems to lose sight of the possibility of great injury occurring where a large number of animals were kept together in one stable. For instance, we will take a stable of horses,—and I am going to talk about horses because I know more about them than I do about cattle. Perhaps in an illy ventilated stable as long as the animals are fortunate enough not to contract any contagious disease, they may do fairly well, so far as that condition commonly called health, is concerned, but practically, as is generally known, when a horse occupying that kind of a stable is tested by the work which it is able to do, it does not continue in the same good condition as it would if he was kept under better hygienic conditions. But to go back more directly to the subject, the main point that I want to bring out is that there is no doubt that a horse is more apt to contract influenza or any contagious disease, and that when any such disease is brought into one of those poorly ventilated stables it is more apt to be disseminated through that stable, more quickly, more rapidly, than in a stable that is properly ventilated. We see that right along in Chicago, and I dare say any practitioner sees it anywhere. I have exemplified the idea of proper ventilation by suggesting certain means of ventilation wherever new stables have been built by clients of mine, and in all instances there has been a decrease in the amount of contagious disease among their horses.

I want to again repeat, and to go on record as condemning the work of the Minnesota Station in issuing such a bulletin as that, and allowing it to go broadcast, that tends to belittle, as it were, the great importance of good ventilation and pure air. I think it is dangerous, very, very dangerous.

INFECTIOUS LIP AND LEG ULCERATION OF SHEEP.

By M. E. KNOWLES,
State Veterinarian for Montana.

A disease not uncommon in England, Wales, and Scotland, there known as contagious dermatitis, or orf (Walley), crusta labialis (Williams), carbuncle of the coronary band (Robinson-Clark), necrotic dermatitis (Mohler, 1907), contagious pustular dermatitis (Arthur H. Berry, London), and pertinently designated, by Doctor Berry (*Journal Comparative Pathology,* December, 1901) as a disease more familiar to the shepherd than to the veterinarian. It is recited by Berry that the disease in Great Britain "more often occurs in low-lying, undrained, and wet lands, especially during or after prolonged rains."

This is not true in Montana. While the disease described by Berry is probably identical with lip and leg ulceration as it occurs in Montana, it is with us a distinctly fall and winter disease. I have observed it as early as the latter part of August and continuing until the following April; but the time of greatest prevalence is midwinter. Again, during rainy times of the year, when our range forage is succulent and green, the disease does not appear. We do not observe it in low-lying or swampy localities; in fact, its first appearance in Montana was among two bands of sheep in the eastern end of the Bear Paw Mountains, Chouteau County, at an elevation of at least thirty-five hundred feet. All outbreaks in Montana have occurred in our northern and eastern tier of counties, among mountains or high rolling prairies; in no case at an altitude of less than twenty-five hundred feet.

In any of these localities, however, may be found swampy areas extremely limited in dimension; usually in the vicinity of a stream, lake, or so-called pot-hole (a small depression holding surface or drainage water).

During the prevalence of the disease in Montana, all such places are frozen over, and at this time usually the sheep depend upon snow for moisture; at intervals subsisting upon range forage and snow for two or three months at a stretch without access to water.

Sheep of all ages are susceptible, and I have observed no apparent difference in severity attributable to age; but among sheep on short range and indifferent water, necessarily poorly nourished, the disease is most severe and fatalities relatively greater.

Perhaps 60 per cent. is the largest number of infections observed by me in any one band of sheep, the average being from 15 to 20 per cent. Mortality is normal where sheep are on good range, well nourished, and the ulcers are promptly properly treated.

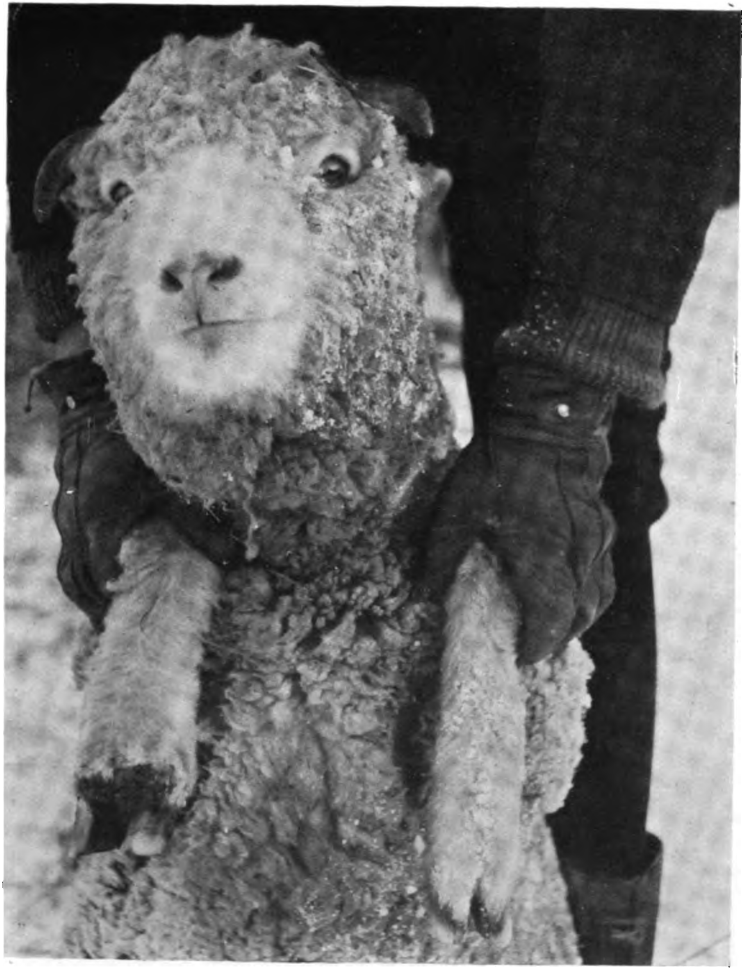
Symptoms.—If a leg be the point of infection, the sheep shows lameness early and as the ulcer progresses will lag behind the band; an examination at this time will show a well progressed, necrophorus, vascular ulcer, usually in the vicinity of the coronet; or between the coronet and knee; with plainly apparent swelling and acute inflammation of contiguous tissue. If necrotic area of skin at point of infection has not been disturbed, it will be found covering the ulcer, lid-like, lightly attached by threads of connective tissue, and about the loosened edges a thick creamy pus exudes.

If promptly treated, progress of the disease is cut short and the ulcer rapidly heals; if neglected, destruction of tissue rapidly progresses until the ulcer may cover an area of an inch or two, and if over the coronary articulation not infrequently penetrates the joint, in some instances observed, complete disarticulation of one or both coronary joints has occurred.

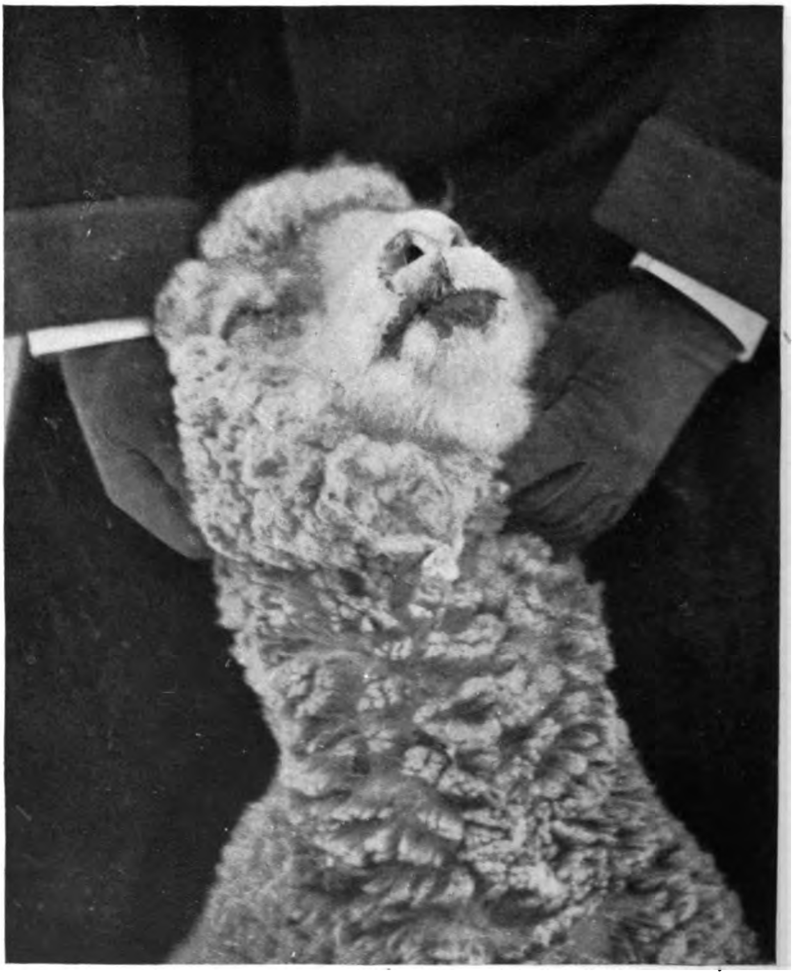
If the lip be the seat of infection, it will be observed that the sheep is not feeding, or is feeding indifferently and with apparent effort. Examination will show swelling, radiating from point of infection, hard and tense; a necrotic skin area dependent upon the extent of primary infection; and in not longer than sixty-four hours a well-defined necrotic vascular ulcer, identical pathologically with that of the leg.

The lips and legs (usually the anterior) are the ordinary points of infection, although in a few cases observed, one or both eyes have been infected, ultimately resulting in total destruction of the eye or eyes. In several cases the pharynx was involved; one of which had evidently a secondary infection in the right lung; all of these succumbed.

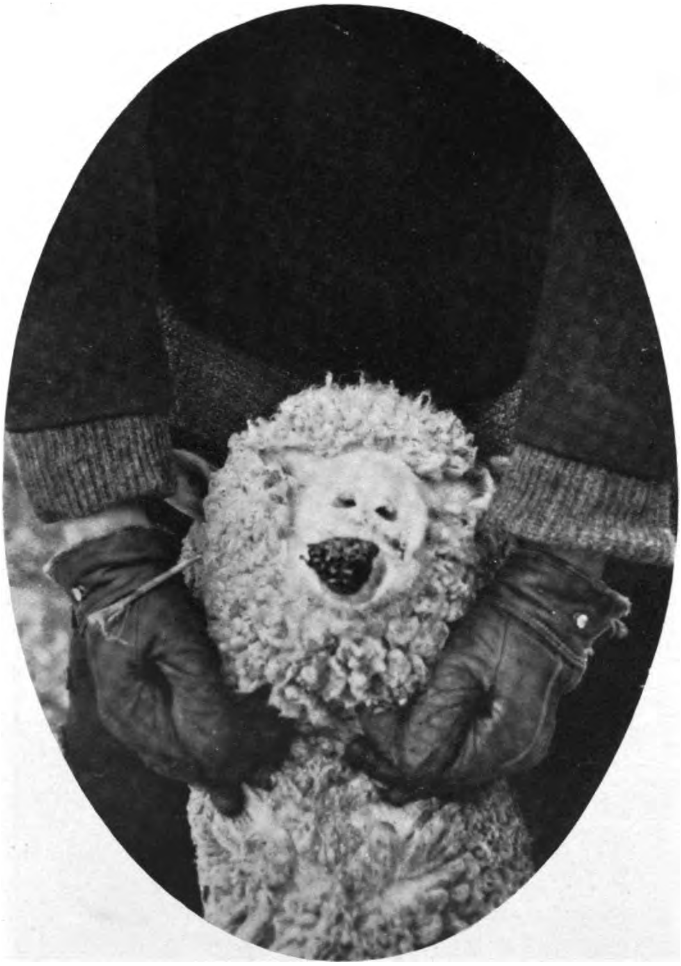
The lip ulceration not infrequently, if neglected, extends



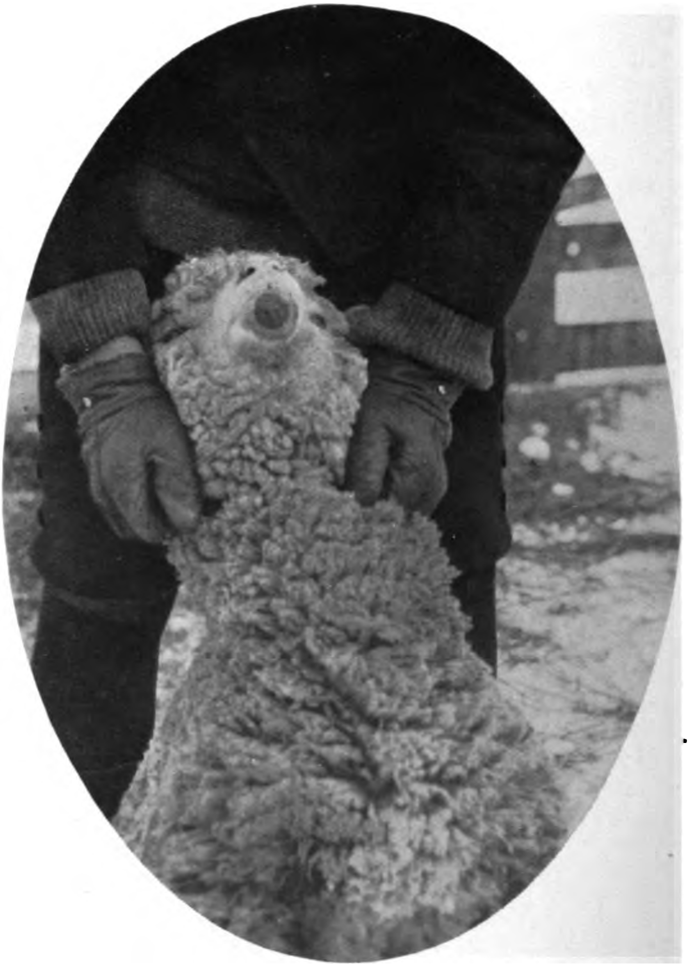
Destructive ulcers right foot and coronet and cleft involved. Natural infection.
Photo by Knowles.



Ulcer of chin and lower lip. Natural infection. Photo by Knowles.



Destructive ulcer lower lip and chin. Photo by Knowles.



Ulcer upper lip three days after inoculation. Photo by Knowles.

to the mucous membrane of the lip and gums, rapidly destroying all intervening soft tissue to the bone.

Infectious lip and leg ulceration of sheep is due to the bacillus necrophorus, identified by Prof. Emil Starz in 1904 and by Dr. John R. Mohler in 1907. This ubiquitous organism, of the numerous animal infections occasioned by it (excepting lip and leg ulcer of sheep), is described splendidly and fully in Bureau of Animal Industry Bulletin No. 67, by Mohler and Morse. It is an inoculation disease. The bacillus necrophorus does not infect unless there be an abrasion.

> "Very few organisms exhibit a wider range of pathogenesis. According to clinical observation the necrosis bacillus has so far been found pathogenic for cattle, sheep, goats, antelope, reindeer, red deer, roe deer, horses, asses, hogs, kangaroos, rabbits dogs and chickens. Experimental work adds to the foregoing list mice and, under special conditions, guinea-pigs and pigeons.
>
> "It is probably safe to assert that no tissue of the body of a susceptible animal is safe from its destructive influence.
>
> "Natural infections induced by Bacillus necrophorus may be considered as follows: Necroses of the skin, hoof, muscle, cartilage, mucous membranes (mouth and upper air-passages, digestive tract, gential tract), navel, and viscera.
>
> "Necrosis of the skin in horses has occurred enzoötically on a large breeding farm, the necrosis appearing on portions of the skin exposed to pressure of the harness. A necrotic form of scratches has also been shown to be a local infection of bacillus necrophorus. Gangrenous pocks in cows have the same origin, and consist of an acute necrotic inflammation of the skin and soft parts of the teats. In hogs such a necrotic process has occurred in the skin of the muzzle, of the outside of the lips, of the feet, and, in sows, of the udder.
>
> "Necrosis of the hoof includes in horses a progressive necrosis of the soft parts of the hoof, often involving the bones and cartilages; in cows, reindeer, and roe deer, panaritium, or so-called foot-rot, involving tendon sheaths, tendons, bones, and joints; in sheep, foot-rot, recently shown to be due to the necrosis bacillus.
>
> "Necroses of muscle have been reported in connection with a granulating wound of the inner side of the hind leg of a cow, also as a result of the passage of a foreign body from the stomach into the heart muscle, and also in a case where a cow's heart, kidney, and some of the voluntary muscles were affected.
>
> "Necroses of cartilage are represented by those already included under hoof necrosis, by quittor, or fistula of the lateral cartilages, and by the laryngeal cartilages in many cases of necrotic stomatitis.
>
> "Necroses of bone have been reported in association with the hoof necrosis of various animals, in the vertebræ in the course of some cases of necrotic stomatitis, and in the turbinated bone of the horse.

"Necroses of mucous membrane may be regarded as quite frequent. Those of the mouth and upper air passages are fully discussed in this paper, and have been recognized in the calf, adult cattle, pigs, sheep, kangaroos, rabbits, asses, hogs, and chickens. No less sensitive are the mucous membranes of the digestive tract. In pigs the upper portion of the esophagus, by extension from the mouth, and in calves the esophagus in its entire length have been affected. In hogs these "necrophorus" patches have been found in the stomach, small intestines, cecum, colon and rectum. In horses they have been demonstrated in the colon; in cattle, in the rumen, in the reticulum, and in the small intestine; and in the deer and antelope, in the stomach.

"The mucous membranes of the genital tract of cows that have recently calved are often invaded by the Bacillus necrophorus, resulting in a necrotic vaginitis and a necrotic metritis.

"Navel disease in calves and lambs, is dependent in a considerable number of cases on infection of the wound by the necrosis bacillus.

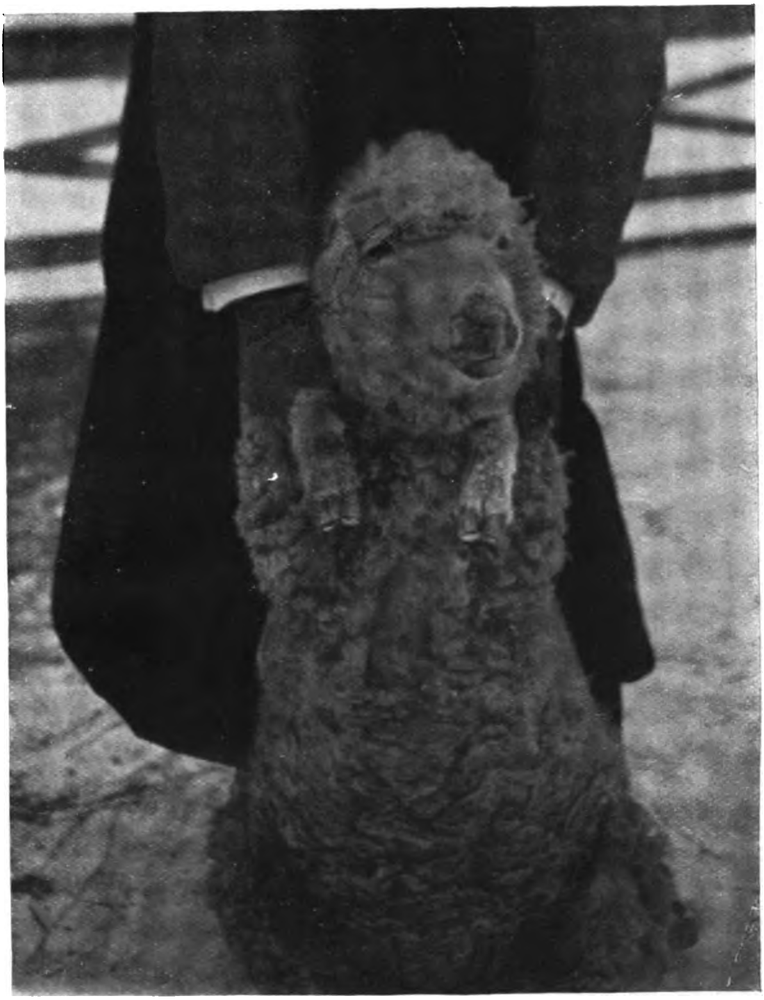
"Bacillary necrosis of the heart, lungs, liver, and spleen, also of the udder, have all been reported as the result of metastasis from the original seat of the disease, in necrotic stomatitis, necrotic scratches. the various forms of foot-rot, and infection of the genital passage.

"The classic example of Bacillus necrophorus in mixed infections is hog cholera. Here it has been proved unequivocally that the deep necroses and so-called diphtheric processes occuring in the body of a pig affected with hog cholera are due in some cases to the invasion of the necrosis bacillus. It has also been found as a secondary invader in the necrotic patches in so-called fowl diphtheria."

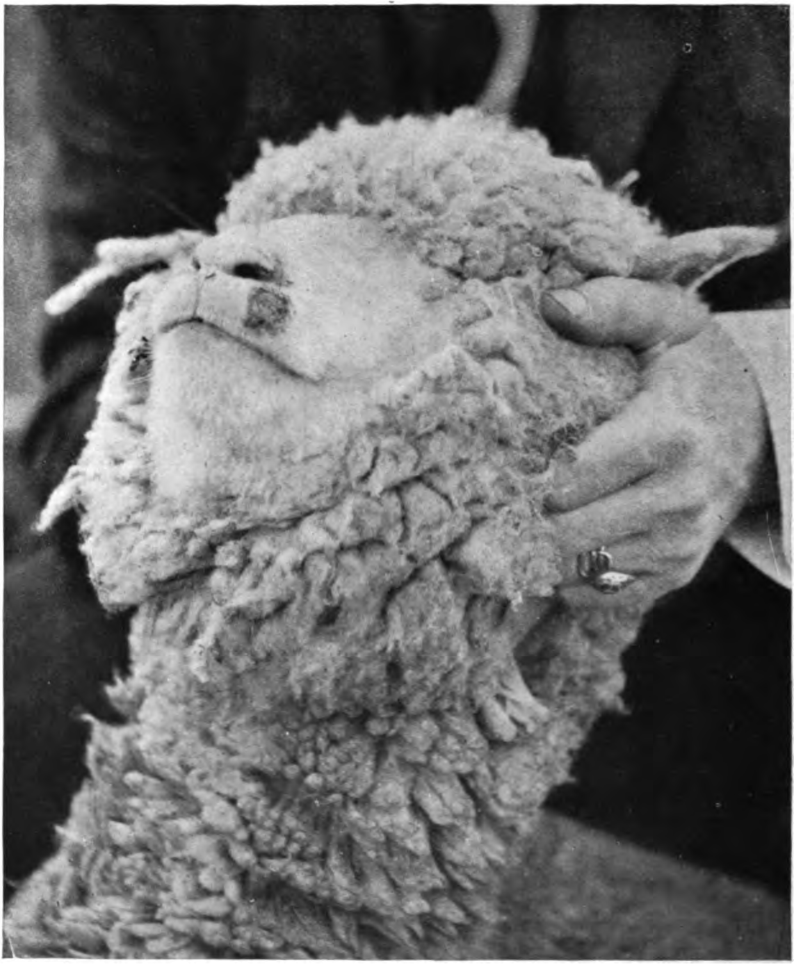
The inoculation experiments of Mohler and Morse coincide with a series conducted by me during the winter of 1904, in which twelve sheep (aged from two to ten years, six ewes and six wethers) were selected from a locality in which this disease was unknown among sheep, and six infected sheep from a locality in Chouteau County, where the disease was quite prevalent at this time (winter 1904).

During the latter part of February these sheep were all placed together in a box-stall 14 x 18 feet; pleasant weather permitting during the day, having access to an adjacent corral twenty-five feet square. They were constantly intimately mixed; were fed abundance of alfalfa hay, on the ground, with constant access to water and salt in common receptacles. In fact, all conditions were made as favorable as possible for natural infection of the clean sheep. Although they were kept constantly in the closest contact during nearly a month, not a single clean sheep became infected.

At the expiration of three weeks from the time the sheep were placed together, six of the clean sheep were inoculated by needle



Ulcers both lips and right leg three days after inoculation. Photo by Knowles.



Extensive ulcer front and lateral aspect both lips. Natural infection. Photo by Knowles.

scratch, three on lip and three on leg, lip inoculation made with pus from leg ulcer of one of the infected sheep and leg inoculation with pus from lip of an infected sheep. A typical inoculation ulcer being produced in each case (see photographs A-1 and A-2) within twenty-four hours after inoculation.

Mohler states that none of the infections occasioned by this organism recover spontaneously.

This is not true of lip and leg ulceration. All my experimental sheep—those naturally infected and those inoculated—made complete and uninterrupted recovery without treatment, other than abundance of alfalfa hay, water and salt. In fact, they were all perfectly well before the middle of April and were sold to a local butcher.

This limited experiment would tend to show that the transfer of this disease from one sheep to another does not occur; at least, always in close confinement, or under feed-lot conditions.

The only serious outbreaks of this disease observed by me have been among strictly range sheep. It would seem that the range grazing of sheep, passing over all sorts of forage, much of which is stiff, brittle and likely to abrade, evidently subjects them to greater possibility of abrasion and trivial wounds of the lips and legs.

A question of some importance remaining to be solved is whether the object making the abrasion is itself infected; or does the wound made by a non-infected object become infected through other media, subsequent to the injury.

> "Necrotic stomatitis is enzoötic—never epizoötic; that is to say, instead of covering a wide area, like foot-and-mouth disease or pleuro-pneumonia in their march of devastation, it involves in its infection only the members of a few herds or the animals on a single farm. This is due largely to the nature of the infective agent. Being a strict anærobe and not very resistent to germicidal influences, such as light, there is, under what are termed natural conditions, little possibility of the conveyance of the microbe from place to place. Another characteristic of the Bacillus necrophorus is that it is, strictly speaking, a secondary invader. This requires special conditions of receptivity on the part of the animal infected. For example, there must be a break in the continuity of the tissue to which the necrosis bacillus is applied."

Sheep of all sexes and all ages seem to be equally susceptible to infection.

Mohler and Morse, in reviewing the economic importance of the Bacillus necrophorus, say: "Consideration must be given to the other infections produced by this organism, some of which are found more grave than necrotic stomatitis."

While lip and leg ulceration of sheep is less grave from a mortality viewpoint than other infections produced by this same organism, it is of equally as much economic importance, on account of the possibility of the wide dissemination of this disease occasioned under unfavorable conditions, particularly loss of condition, and of no small consequence is time, trouble and expense of treating the disease among large bands of sheep, such as are commonly owned in Montana; rarely less than twenty-five hundred or more than five thousand, among which, even 10 per cent. infected, necessitates much labor and time in treatment.

Contrary to all other forms of infection by this organism in various animals, many cases of lip and leg ulceration in sheep recover without treatment, even under range conditions; particularly when the sheep are well fed and not exposed to inclement weather, and in any event early treatment by application of nitric acid c.p. one to seven of water, powdered copper sulphate, or carbolic acid, 50 per cent. solution, insures rapid recovery, after two or three applications, which should be made daily.

There has been persistent effort on the part of a great many Montana sheepmen to designate this disease foot-and-mouth. There is certainly no good reason why this should obtain, as there is hardly a symptom presented that could be mistaken for any one of these symptoms of this dread disease. Therefore, more for the purpose of allaying unwarranted suspicion occasioned by the use of this term (foot-and-mouth disease), I have insisted on giving it the name used in the title, which appears to designate plainly the condition.

The photographs herewith presented show very typical cases of the disease. Unfortunately, the ones given are the only good pictures I succeeded in getting, although attempts were made to photograph a few very much worse cases. But the accompanying photos will certainly show the condition sufficiently plain to obviate mistake.

PREVENTIVE MEDICINE, U. S. ARMY.

By L. E. WILLYOUNG,
Artillery Corps, Fort Riley, Kansas.

The practical application of so-called curative medicine at the present time is dependent on cases of emergency origin. Among practitioners of both human and comparative medicine in civil life, curative medicine is more frequently employed than among the professional men of our army.

To illustrate, throughout the United States and its territorial possessions troops and animals are segregated, in many instances numbering several thousands, establishing so many small cities.

To prevent intermingling of persons and animals under such conditions is next to impossible, without establishing the most rigid quarantine, and this would seriously interfere with the daily routine work, also render a most inefficient service should infectious diseases appear in their midst.

In event of diphtheria appearing in one member of a family residing at an army post, it is the custom to-day to apply serum therapy to the patient for presumably curative purposes, while the remainder of the family receive similar treatment as a preventive measure. The result is, in most instances, the patient survives and the other members of the family become immune, at least escape the severity of the disease.

Immunity against smallpox is established among our men in a like manner, vaccination being resorted to at least once yearly and frequently at shorter intervals, especially when troops change station from one post of the States to another. It can safely be stated that among our numerical strength less smallpox exists than among any other community of like size in any part of the world.

Preventive medicine is not a mere sensation out of season; it is the fundamental basis of modern therapy. In ages past an immune was an honorary member; it may be safe to say in ages to come, we may all achieve that rank and title, depending mainly on the application of preventive medicine.

Immunity against disease is considered as congenital or acquired; the latter might properly be termed conferred, as it is due to many of our present antitoxins that this immunity is conferred. It has also been contended that some antitoxins are natural constituents of the living blood of animals, thereby conferring a natural immunity against some diseases. Possibly this explains the so-called resistance with which we meet in so many horses.

Curative medicine still holds its place among many microbian diseases, one of which is malaria. Quinine is a universal remedy, also a successful one when from 20 to 60 grains are used daily, though twenty years ago we were taught never to employ more than three grains at one dose once in four hours. Whether its effect on the system is accumulative and combative, I am not prepared to say; but we do know that the producing elements are not found after the alkaloid has been administered to a malaria patient for some time. To prevent the spread of this common disease it is customary to screen the patient, simply keep away mosquitoes, then massacre the existing mosquitoes. The latter should, of course, be accomplished beforehand.

Shulin states that the smaller animals are most susceptible to streptococcic invasion, the horse and ass least of all. Our work does not bring us in contact with laboratory animals, but with the horse and my experience demonstrates that 95 per cent. of all injuries in the horse are invaded by this form of bacteria.

I refer now particularly to cutaneous injuries, punctured and broken skin, resultant to kicks, etc. This condition exists along the Atlantic, Gulf, Middle West, and Northern States. The anatomical location of many such injuries precludes perfect asepsis, hence the result.

It should be remembered, however, that in our army a great portion of injuries occur and are treated in the open field, during all kinds and conditions of weather. During 1905, I enjoyed the pleasure of field work for six consecutive months.

As all horses for the army are usually shipped many miles to their destination, we may feel assured that most of them will be suffering with shipping fever (so called) by the time they reach us. The chief factors in producing this form of influenza are the culture beds in sale stables of the larger cities and the abominable palace horse cars.

An example, on July 15, 1907, seventeen horses were shipped from Lathrop, Mo., to Ft. Sill, Oklahoma; upon removing these from a palace car, all were found to have a temperature of over

104° F., with nasal discharge and submaxillary adenitis; one of the number was dying. July 25, 1907, another consignment of twelve reached us from East St. Louis; these were shipped in an open stock car and reached us in better condition, but all were sick.

Such animals, both horses and mares, to-day cost the government $210 each, and we are told that it is difficult to procure them even at that price.

While in Texas several years ago, I employed the serum treatment on a number of new animals suffering with shipping fever with very good results. During 1906 while in Kansas, I treated eighty-two cases of this disease among new stock shipped from East St. Louis, with antistreptococcic serum, with but two deaths. Several assumed the form of purpura.

At Ft. Sill, with the second consignment, the serum was at once administered in doses of 10 to 20 c.c., and in but one single horse did the disease assume the form of strangles.

A certain reaction follows the administration of antistreptococcic serum in most cases where there is an elevated temperature. The following conditions are apparent:

A period of slight uneasiness, seen usually one hour after injection and lasting perhaps two hours. Increased respiration, and pulse, often slight activity of the bowels, after having assumed a standing position for several days they will frequently lie down for an hour or more. This occurs several hours after its administration.

The temperature almost invariably drops from 2 to 3 degrees at the end of eight to ten hours. The appetite is also markedly improved.

This has been my observation among over 200 animals of ordinary occurrence during the past three years.

In cases of purpura its effect is not so marked, but with its use in our hands the daily administration of 20 c.c. has in most cases produced a very tonic effect, and in most cases we have witnessed a more rapid recovery, compared to the old method of treatment.

The immunization against influenza, of all purchases for the army, was recommended to the War Department one year ago, and I learn that one lot was so treated at St. Louis during the early part of this year, but am not in a position to state results; neither am I positive that it will be continued. I have, however, authentic reports that the treatment was applied to a number of army animals and a serious outbreak was averted in one particular centre.

The question has arisen, can lethal doses be administered? This is a subject for our advanced agents. Repeatedly have we injected 40 to 50 c.c. of the serum daily with a temperature of 104° F., and drew this conclusion: Where the early administration was accomplished, good results follow; later, after serious complications are present, neither good nor baneful results followed.

Among the number of twelve horses treated here with serum, no medicinal agents were employed but a variety of green food, and plenty of same was offered and eaten.

From the literature available on the subject of immunity, the semi-accepted theory of phagocytosis and lateral chain phenomena seem to prevail. Our prepared serums appear to aid this phenomena and in many cases prevent aggravated forms of disease. Our experience tends to demonstrate that the results are entirely commensurate to the cost of the products employed.

While attending the meeting of this Association at St. Louis during 1904, the subject of standardizing antitoxins was brought before the members here, and then it was stated upon authority that at that day such undertaking had not been accomplished, and I believe the conditions of things remain the same to-day, especially with the manufacture of a polyvalent serum.

The work along this line, however, deserves commendation; the methods of solving these difficult problems and the discoveries made in the sciences of bacteriology depends largely on the active practitioner to apply these new methods in his daily work and authentically report results.

Among recent orders to us from the War Department, one prescribes that all animals (horses and mules) in the army service be malleinized every three months. This has led to no end of comment. The veterinarian, however, is in a position to recommend lengthening this interval, and I have found that Post Commanders do not, as a rule, care to lose the use of an entire squadron or battalion while this work is being conducted, unless it be absolutely necessary.

This order was issued at the suggestion of several army veterinarians in order to determine if or not, glanders prevailed to any extent among horses and mules in the general service. The work has been accomplished once, and at some posts twice, all through the United States, since February 12, 1907, and some few glandered animals were destroyed. To-day it is safe to state but few if any cases of this disease is among our mounts. In conclusion I will state, that with modern inventions penetrating opaqueness, the transmission of intelligence over water and through invisibility, and radium demolishing all past theories of matter, what may we expect? We know now the origin of many of our infectious diseases and how to prevent them by early intervention.

On the contrary, the reforms in treatment and prevention of disease, potent for good as they are, may still leave among our animals exposed to the ravages of germs of disease that arise from the inexhaustible culture beds of unsanitary conditions, ignorance and poverty, a field for the veterinarian for many years to come.

Sententitiously speaking, "human life is sacred." This prompts more active work and secures the more earnest efforts of our sister profession, and for this reason also, has the veterinarian in the army been deprived of well-earned rank.

It behooves us therefore to marshal personal resources, display self-reliance and what little authority we possess, thereby meriting confidence of superior authority and the general public.

THE SURGICAL RELIEF OF ROARING.

By W. L. WILLIAMS,
Ithaca, N. Y.

We had occasion to present a communication to this Association at its last annual meeting upon the surgical relief of roaring, embodying a brief description of a modified technic with a report of ten cases, some of the most recent of which had not progressed far enough to determine the result. (Proceedings American Veterinary Medical Association, 1906, page 179.)

We are now enabled to add somewhat to the recorded results in the ten cases reported last year, along with thirteen new ones, twelve of which have reached a stage where the results are apparently reliably determined.

Case 1.—A bay trotting mare so badly affected that she was practically worthless and was being used for trading purposes. The operation was performed on November 10, 1905, and the patient discharged on December 11, much improved. On June 3, the owner reported some noise in breathing, but the animal was gradually improving. The difficult breathing was inconstant and much of the time was not observed. Somewhat later in the summer I was informed by Dr. Crawford, of Athens, Pennsylvania, in whose immediate territory the mare was owned and kept, that she was continually improving and, when driven at a rapid pace on an ordinary road, went sound.

Case 2.—As reported last year, this animal died soon after discharge, from abdominal disease after working but little, though showing very distinct improvement.

Case 3.—A brown gelding used for general farm and road work, had become a very bad roarer. He was operated upon January 15, 1906, and discharged February 21, 1906, distinctly improved. He was put to ordinary farm work in April and for a time breathed imperfectly when pushed, but gradually improved until the owner was able to report on the 3rd of July that the recovery was complete and that no abnormal sound was made while at work on farm or road. In a communication dated April 5, 1907, the owner stated that the animal remained sound.

Case 4.—A bay trotting mare which had become worthless for road work on account of roaring. She was operated upon January 29, 1906, and discharged March 14, improved. The owner reported on May 22, 1906, that she was greatly improved and doing satisfactory work. On August 26, 1907, the veterinarian in whose territory the patient was owned and kept when operated upon, reported that the improvement had continued, but that the animal had left the vicinity.

CASE 5.—Patient a valuable coach horse from the practice of Dr. W. H. Ridge of Trevose, Pa., which was operated upon at the meeting of the Pennsylvania society on the 6th of March, 1906. Fifty-one days later Dr. Ridge reported that the horse tested sound at a gallop and on June 11, of the same year he was given a keen drive on a tally-ho without revealing any abnormal sound. On August 17, 1907, Dr. Ridge further reported the horse still at tally-ho work and perfectly sound.

CASE 6.—A very bad roarer operated upon in our clinic May 23, 1906, and last report stated that he was working sound on August 16, 1906.

CASE 7.—An exceedingly bad roarer unfitting him for slow light work. The operation was performed in the practice of Dr. V. M. Knapp of Danbury, Conn. The operation was highly successful and fully restored the animal to usefulness, was sold at a good price and later died from other causes.

CASE 8.—A bay road mare belonging to Dr. C. E. Clayton, New York City. Operation was performed July 6, 1906. The operation was practically without result; the character of the sound was altered, the fluttering or vibratory sound has ceased, but there is still an abnormal sound as in tracheal stenosis which is little if any less than the original roaring in volume. In our communication of last year we related that in an experimental case the arytenoid cartilage had dropped down into the cavity of the glottis and become firmly fixed there apparently as a result of cutting away too freely and completely the vocal cords and subjacent tissues. In our judgment we here fell into this error and removed too much supporting tissue.

CASE 9.—A brown coach gelding in the practice of Dr. Geo. H. Berns of Brooklyn, N. Y. Operated upon July 8, 1906. Soon after the healing of the wounds there was still considerable dyspnœa although there was definite improvement. The improvement has been gradual until Dr. Berns reported in June, 1907, that the horse was fully restored to usefulness.

CASE 10.—A brown road mare in the practice of Dr. W. W. Kennedy of Fulton, N. Y. The operation occurred on August 2. 1906, and marked improvement followed and has remained, but there is still considerable dyspnœa whenever the animal is rapidly driven. So far as we can determine from reports we here again fell into the error of removing too freely the vocal cords and underlying muscles and allowed the cartilage to drop down into the glottis and become adherent there obstructing the passage of air.

CASE 11.—A bay trotting gelding from the practice of Dr. Ross, of New Haven, Conn., operated upon in the clinic of the A.V.M.A. on August 24, 1906. The patient apparently did well for a time, but by October 1st was breathing very badly. On October 22d, in company with Drs. Kelly, Whitney. Bland, Adams, and Lyman, the horse was examined and found greatly distressed in breathing, making a loud noise while standing quietly in the stall. Examination of the seat of tracheotomy revealed it enlarged. and slight pressure upon the point increased the dyspnœa to the point of threatened suffocation. The animal was cast, the trachea opened at point of tracheotomy, and it was found that one or two tracheal rings had collapsed, one had softened and largely disappeared, the collapse causing almost complete stenosis of the trachea. A trachea tube was placed in the wound pending further decision. The animal later passed into the control of other parties, and reliable trace of him was lost.

Case 12.—Patient a very bad roarer, property of Dr. L. B. Judson, Winsted, Conn. Operated upon at A.V.M.A. Clinic, August 24, 1906. Dr. Judson reported personally on August 6, 1907, that the horse was still in his possession and used in his practice. Under ordinary conditions no abnormal sound can be detected, but by loading him heavily and driving rapidly up hill a slight abnormal sound is sometimes noted.

Case 13.—Patient a black gelding from the practice of Dr. Thomas Bland, Waterbury, Conn., had been obliged to wear a trachea tube for one year because of severe roaring. Operation at A.V.M.A. Clinic August 24, 1906. Reported by Dr. Bland, August 6, 1907, to be entirely cured.

Case 14.—Patient of Dr. G. P. Jeffery, Elmira, N. Y.; gray saddle gelding, bad roarer. Operation August 31, 1906. On November 27, 1906, the owner reported little or no improvement. On March 15, 1907, Dr. Jeffery reported that he was gradually improving, but that he still roared slightly at times under unusual excitement. Owner had recently ridden him 8 miles in 42 minutes or at a pace of $11^{3}/_{7}$ miles per hour, without inducing abnormal sound.

Case 15.—Patient occurring in the practice of Dr. W. L. Baker, Buffalo, N. Y. Operation in clinic of New York State Veterinary Medical Society, September 13, 1906. Dr. Baker reported animal completely cured in February, 1907.

Case 16.—Patient a thoroughbred hunter, a bad roarer which could not follow hounds. Operation October 1, 1906. When the wounds had healed after about four weeks it was found he still roared. The patient was kept under observation for some weeks longer and was finally secured, anæsthetized and the larynx re-opened which revealed the fact that the left arytenoid cartilage instead of adhering in the normal position to the thyroid had dropped down over the cricoid and adhered there with its antero-inferior or vocal angle projecting out into the glottis, greatly decreasing its lumen, and evidently largely if not wholly responsible for the continued roaring. The projecting angle was largely excised. The owner reported on July 29, 1907, that the horse had made a thousand mile journey during May and June, doing the work well, but could not gallop rapidly without roaring badly.

Case 17.—Patient from the practice of Drs. Johnston and Backus, Geneva, N. Y. Operated upon in the college clinic December 2, 1906, and discharged on December 23d. Case apparently progressed well until in the Spring of 1907 or about four months after operation when dyspnœa developed and became so greatly aggravated that the animal was destroyed. Opportunity for an efficient autopsy was not offered, but so far as could be learned by limited examination the difficulty lay in the inflammation and collapse of the severed cricoid cartilage.

CASE 18.—A very bad case of roaring in a thoroughbred used in steeplechase racing. The operation was performed in practice of Dr. E. J. Sullivan, Saratoga Springs, N. Y., on November 29, 1906. A trachea tube was inserted during the operation and removed immediately after. On the 4th of March, 1907, Dr. Sullivan reported that the owner and trainer had tested the horse over 5 ft. 9 in. hurdles without producing abnormal sound. Later it was reported that the horse had refused the hurdles when put to training, so has not raced, but the recovery from roaring at last reports was apparently complete.

CASE 19.—A thoroughbred gelding, entered in the college clinic, November 19, 1906. When discharged he had been galloped as hard as considered prudent and tested sound. The owner reported July 30, 1907, that the horse had been in training two weeks, but had not been pushed far enough to determine his ability to stay over a long distance.

CASES 20 and 21.—Two hunter geldings, both very bad roarers; operated upon in the college clinic January 16, 1907, and discharged March 4, 1907, after testing sound at a moderate gallop. The owner reported, July 29th, that no test had yet been made in the hunting field. They had been tested in farm work on soft ground enough to demonstrate that they were very greatly improved and at least were sound for ordinary work.

CASE 22.—Thoroughbred belonging to same party as Case 19, and operated upon in the college clinic April 27, 1907. Discharged June 4, 1907, after testing sound at a moderate gallop. On July 30, the owner reported horse turned to pasture without having been severely tested.

CASE 23.—Property Dr. B. D. Pierce, Springfield, Mass. Operated upon in the clinic of the Connecticut Veterinary Medical Society, August 6, 1907. The horse was a very bad roarer and wearing a trachea tube. Upon opening the larynx there was observed a tumor or firm swelling above the right arytenoid cartilage, while the left cartilage was passive. The usual operation was performed without interfering with the tumor above the right cartilage. On account of this tumor or swelling, about two inches long and projecting over the glottis one-half inch, an unfavorable prognosis was given.

In this list of twenty-three cases, the results in twenty-two have been fairly determined, the twenty-third being too recent for any conclusion, and because of other complications being of little if any value in determining the efficacy of the operation.

Of the twenty-two cases, two or a trifle less than 10 per cent., were in a sense ruined, less than 14 per cent. were left slightly improved or unchanged, while the remaining seventeen, or 77 per cent., were either greatly benefited or completely cured, and were made capable of rendering satisfactory service.

Of the two cases ruined, one (No. 11) was not due to the major operation itself, but to the tracheotomy followed by chondritis and tracheal stenosis. In the second case (No. 17), the bad results seemed to be due to a chondritis resulting from the wound of the cricoid cartilage and first tracheal ring with stenosis at this point.

Those cases which were left but slightly benefited or approximately unchanged, Nos. 8, 10, and 16, failed apparently because of the too free removal of the vocal cords and underlying muscles.

In our communication of a year ago we related that in our first operations we had removed the vocal cords, the mucous membrane from the ventricle of the larynx and the inferior bundle of the thyro-arytenoideus muscle. We then became suspicious that we had removed too completely the retaining tissues of the cartilage and allowing it to drop too completely into the glottis and there becoming fixed to partly fill the air passage, and we consequently aimed merely to remove thereafter the vocal cords and mucous membrane of the ventricle.

Even here we seemed to fall into error because the muscles underlying the vocal cords are so wasted that they have little power in retaining the cartilage in position, and it was only after we had made the second operation on No. 16 that we realized that this displacement of the cartilage into the glottis was a danger to be reckoned with so long as the vocal cords were removed that we abandoned this and confined our interference to the removal of the mucous membrane lining the ventricle. This is an old operation, attempted by Gunther apparently and abandoned by him as inefficient, but we have not been able to find his technic.

As now performed by us, the horse is secured in dorsal recumbency under chloroform, and with a trachea tube in the ordinary position. The larynx is opened by a median incision through the crico-thyroidean ligament, the cricoid cartilage and first tracheal ring. The mucous membrane of the ventricle is grasped usually at the median margin, where it is attached to the arytenoid cartilage, and an incision is made with a long-handled scalpel through the membrane between the arytenoid cartilage and the forceps. The incision is then continued completely around the margin of the ventricle, invading the vocal chords little, if at all. The isolated mucosa of the ventricle is then drawn upon by the forceps and carefully divided from the adjacent tissues, the aim being to dissect out the membrane as a complete sac, necessitating adhesion in the process of healing.

Thus far this change has resulted in more prompt, uniform and complete alleviation of the roaring, but we are not yet ready to state just how much tissue should be removed. It appears to us that once the mucosa has been completely removed from the ventricle, adhesion by cicatrization is inevitable, and if the adhesion occurs with the passive cartilage approximately in its normal position, it must cease to act as an obstruction to the entrance of air. We have reason to hope that we may be able to avoid by our change in technic, the losses from imperfect cures which have amounted to 14 per cent., but the dangers from tracheal stenosis, either at the point of the tracheotomy or laryngotomy, seems to offer difficulties of a more formidable character.

In one case the trachea tube was kept in place only till the operation was completed and the horse was on his feet, and the patient did splendidly. We fear that generally we have kept it in place too long, but in two cases where we tried immediate removal we were obliged to reinsert it because of dyspnœa. Even if we could avoid the ordinary tracheotomy entirely the danger of tracheal stenosis would not apparently be obviated, because in one case we appeared to have stenosis from the wound in the cricoid and first tracheal ring, although no tube was used in this wound.

It has been proposed to avoid tracheal stenosis in this region by dividing the thyroid and leaving the cricoid and first tracheal ring intact, but we are unable to determine that such a wound might not be followed by untoward disease of the thyroid. Study upon this point is needed. On the whole our investigations have thus far proven highly interesting. The proportion of recoveries has been high, each case, aside from the two instances of tracheal stenosis, if not cured promptly, have either shown constant improvement for a year or more or at the worst have remained practically unchanged, in which respect they differ materially from the results following arytenectomy where cicatrical tumors and necrosis or other diseases of cartilage occlude or deform the larynx, and invite a gradual and usually insurmountable development of dyspnœa.

The operation is simpler, has less danger for the life of the animal, the patient recovers far more promptly, and all in all, while since last reporting, two animals have been practically ruined by the operation, we yet feel that the results have added to the encouragement entertained last year. In the two animals which were practically ruined the disease had already rendered them of little or no commercial value, except through the agency of permanent tracheotomy, and this course was still freely open in each case, but few Americans will consent to use a horse while wearing a trachea tube.

We venture thus briefly to lay before you the results of our investigations to date, hoping that they may arouse increased interest in the practicability of the restoration to usefulness of a large proportion of valuable animals affected with roaring.

DISCUSSION.

Dr. Merillat: Mr. President and Gentlemen: I will have to apologize for not having been present when the paper was read. In fact, I had a little engagement that took me away, but I had hoped to return before Dr. Williams read his paper. There is very little to add to our knowledge of roaring from year to year except the reports of the different cases operated upon. In the conversations which I have had with Dr. Williams in this connection he has explained his work on the subject for the last year. The operations for roaring which have been recommended from year to year during the past quarter of a century, I believe, have culminated at last in one that is giving fairly good results. The operation that was described by Dr. Williams in New Haven a year ago, that by removing the mucous membrane from the ventricle behind the vocal cord, with the object of forming a cicatrix which would perform the double function of obliterating this ventricle, as well as fixing the vapid arytenoid is proving to be a really valuable surgical operation, proved by the results obtained during the last year by Dr. Williams and by myself. I think I can close all I have to say about this entire matter by simply relating cases which give a very fair idea of the effect of this operation, and the result in, at least, some cases. Upon reaching home last fall from New Haven, about the last week of August, I performed the operation recommended by Dr. Williams on a carriage horse that had been a roarer for several years to such an extent that he was incapacitated for his work. The horse was kept under our treatment for twenty-one days, and then was sent, I think about the first of October, to the country. As there was no use for this animal during the Winter months, he was left in the country until the first of April of this year, at which time he was brought back and given a thorough test. He was hitched into a cart, trotted and run, submitted to the most severe exercises with the revelation that the cure was perfect. This horse on the first of April was shipped to the Summer home of the gentleman who owned him, and has been doing excellent service up to the present time. This is one of the cases which has been thoroughly cured by Dr. Williams' operation.

A second case was that of a trotting bred horse which was not cured immediately, but reports received from time to time have indicated that he was becoming progressively better. At the present time he is quite a good horse.

A third horse which was operated upon was ruined by trachial collapse. Instead of the operation being performed in our accustomed manner a tracheotomy tube was inserted before administering the chloroform, with the result that the trachea collapsed, leaving him in a much worse condition than before operating. That does not mitigate against the operation, however, because the tracheotomy feature may be omitted. I want to take this opportunity to warn against the operation of tracheotomy. It is a serious operation, and, gentlemen, let me warn you that it is a very dangerous one. The percentage of horses ruined by the operation of tracheotomy is very great. The results are sometimes not noted immediately, but may appear months and even years after the operation, at which time the horse roars worse than ever from the constriction of the trachea which is injured permanently. Tracheotomy should be avoided, especially in young animals, and should be used only as a last resort in any case.

If there is any objection to the technique described by Dr. Williams it is in the use of tracheotomy which I consider is unnecessary and dangerous. The operation can be performed without the tube, and if so, that feature of the operation should be omitted. Dr. Williams has claimed that the object of inserting the tube is to rest the arytenoid cartilages. That is, its object is to allow them to remain in a state of repose during the healing of the wound. I think that this is the biggest mistake I have ever heard Dr. Williams make, since breathing through the tracheotomy tube does rest the arytenoid cartilage. In the ordinary inspiration the cartilage does not move much while an animal is standing the movement of the arytenoid is very slight, just trifling. It is in the act of deglutition that the greatest movement of this cartilage occurs, and in this act they move forcibly inward to close the glottis. Now the tracheotomy tube alone, while it might slightly arrest the inspiratory movement has no effect on the movements occurring during the act of swallowing. Immobilization is therefore possible. The operation, however, Dr. Williams has given us is a credit to him. I am satisfied that it is destined to be a very valuable addition to our surgical knowledge. It is so simple that every veterinarian can perform it. I think that the society owes Dr. Williams a great deal for suggesting it. I do not know that he is to be credited as the originator as it is rather the elaboration of suggestions made many years ago. Dr. Williams has, however, pointed out the best method of accomplishing the object, of producing a cicatrix around the arytenoid cartilage so as to fix it permanently against the wall of the larynx.

DR. WILLIAMS: Mr. Chairman, may I say a word more in reply to the remarks of Dr. Merillat? I simply wish to say that in some of the operations which we have tried without a tracheotomy tube there seemed to be a considerable dyspnœa, and we had to insert the tube, but in one case we did get along without it very nicely. I think the matter deserves considerable study and believe with Dr. Merillat that the objection can be surmounted. There is one feature about it which Dr. Merillat did not take into account, and which has been brought to my attention during the past year, and that is, in operating upon a loose mucous membrane about the larynx or pharynx in the horse there is a tendency to the occurrence of emphysema in the region which may produce very great difficulty in breathing. That is to say, air enters from the wound, and becomes disseminated to such an extent as to cause dyspnœa, and if we were to omit the tracheotomy in such cases we must find some other way for overcoming that trouble. This difficulty was especially emphasized in an operation in which it would seem that the conditions are similar to roaring; that is, in the removal of a cyst from the base of the epiglottis. I performed this operation a few months ago, and within a few hours after the performance of the operation there was such a great amount of infiltration of air into the surrounding tissue that it was necessary to insert the tracheotomy tube and keep it there for four or five days before the horse could breathe through the larynx. But with all that, it seems to me that we should find some way, and I hope and believe we will find some way to avoid the danger which arises in these operations, which, as it seems to me, is the chief danger which we have to meet.

DR. PIATT: Mr. President, I would like to ask if the age of the animal has anything to do with the success of the operation.

DR. WILLIAMS: In reply to that question I would say that we operated on one animal which was two years and a half old, and had as good a result as upon any animal we have operated upon. We have also operated upon very aged animals, and I have been unable to observe any difference at all in the probable result. I agree with Dr. Merillat, however, that the dangers from tracheotomy are greater in the young than in the old.

DR. MERILLAT: In answer to that question I would say that in my two cases the ages were respectively sixteen and seven years.

OBSERVATIONS ON THE VETERINARY SCHOOLS IN EUROPE.

By PIERRE A. FISH,
Ithaca, N. Y.

During a recent visit to Europe, twelve veterinary colleges, distributed throughout six different countries, were visited. There were varying conditions in these countries, and, as the methods and customs were quite different from those in America, a brief description may be of some interest.

In the order in which they were visited, the Liverpool Veterinary School comes first. This school forms part of the University of Liverpool. The course of instruction is four years long, each year being divided into three terms of about ten weeks. There are about sixty students. The requirements for entrance are English, grammar, arithmetic, algebra, geometry, Latin, and one of the following optional subjects: Greek, or any modern language or logic. A note in their catalog for 1905–6, however, states that "as there is a probability in the near future of a university degree for veterinary surgeons, candidates are strongly advised, if possible, to pass a high standard preliminary examination—that is, one which will qualify for university graduation."

The tuition to cover the instruction is eighteen guineas, or a little more than $90, per year. The strictly veterinary portion of the work is carried on by Professor W. O. Williams and Professor Share-Jones, with assistants. For the remaining work the students mingle freely with the university medical students in the various departments.

There is no clinic at the University, but the corporation of Liverpool has placed its horse depots, including over six hundred horses, and veterinary infirmary at the disposal of the veterinary staff of the school for purposes of instruction. The students of the fourth year also attend the indoor clinics of some of the veterinary establishments in the city.

I understood also that veterinarians who were qualified might obtain the degree D.V.H., Doctor of Veterinary Hygiene, by devoting two terms to the study of the appropriate subjects at the University.

The Royal Veterinary College of London was founded in 1791, and incorporated in 1875. According to its latest catalog the University of London has recently instituted a Degree in Veterinary Science (B. Sc.). "The possession of this degree will not of itself entitle the holder to practise as a veterinary surgeon, but it is hoped that year by year an increasing number of students will, while studying for the diploma of the Royal College of Veterinary Surgeons, also adopt the curriculum which is necessary to qualify for the University examinations and obtain the degree of Bachelor of Science. In conformity with the statutes of the University, the professors of chemistry, biology, anatomy, physiology, hygiene and pathology in the Royal Veterinary College are recognized teachers in the University."

Four years of study are required at the veterinary school for a student to be eligible for the examination given by the Board of the Royal College of Veterinary Surgeons. It is expected that an additional year must be taken in order to acquire the University degree.

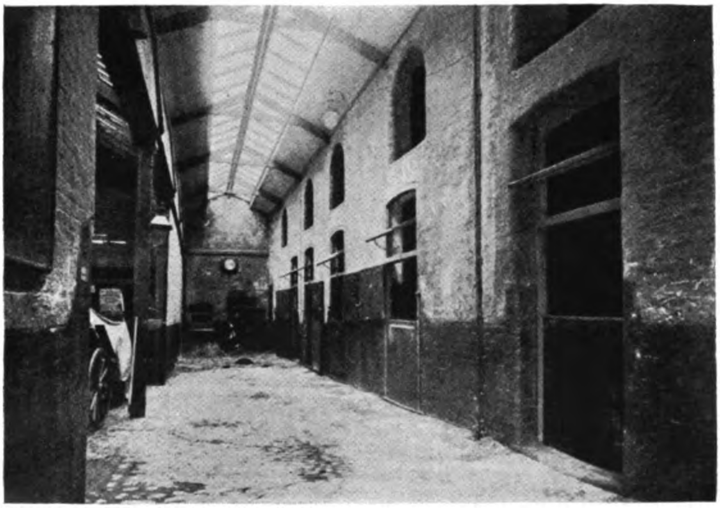
The entrance requirements are much the same as for the school at Liverpool, and include English language, Latin, arithmetic, algebra, geometry and one optional subject, either Greek or one of the modern languages.

From October 1 to about the middle of March there are two terms. A summer term begins May 1, and continues to about the middle of July.

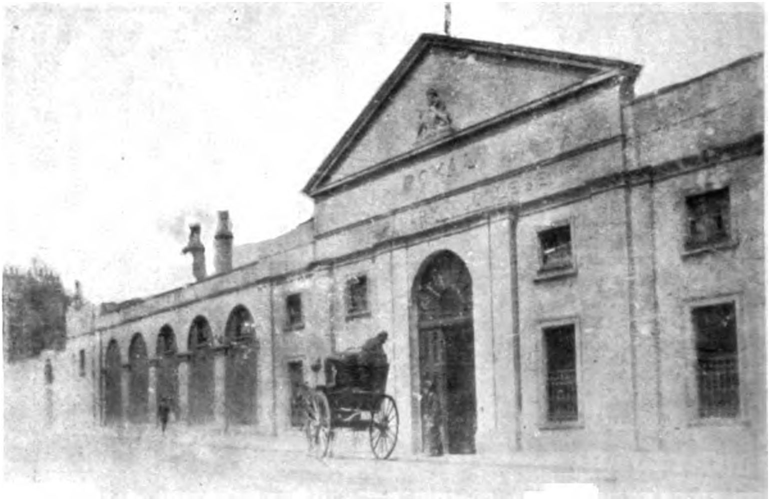
A novel method for raising revenue exists in this college. A person or firm properly approved and elected becomes a "subscriber" to the college. Persons who contribute twenty guineas (about $100) in one sum are life subscribers, otherwise they pay two guineas (about $10) per annum and are entitled to the privileges of a subscriber so long as they continue their subscriptions. A subscriber has the following privileges: He may have in the course of any year five horses examined for soundness free of charge, either before or after purchasing. Any additional horses are charged for at the rate of 10s. 6d. (about $2.50 each). He may have admitted into the infirmary for medical and surgical treatment an unlimited number of horses and other animals, *his own property*, at a charge only for their keep.

He may be supplied with medicine for *his own* animals at a fixed charge.

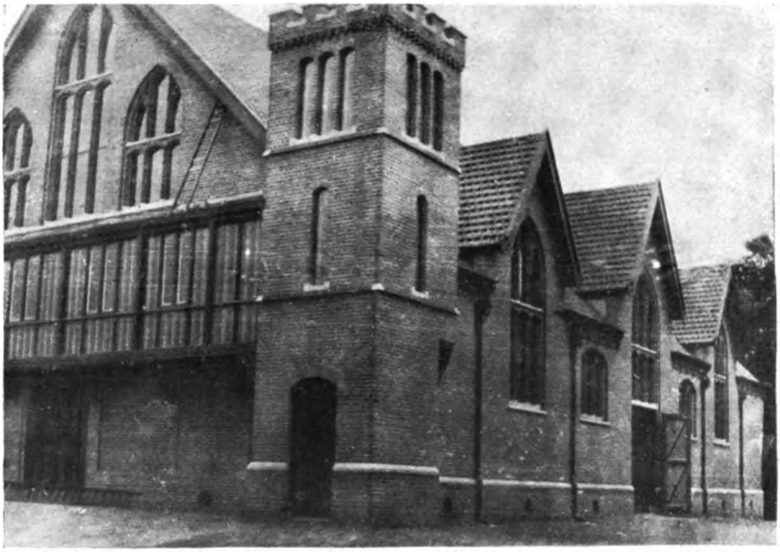
At a fixed rate he may have at the college a chemical analysis



Veterinary Ward. Liverpool.



Entrance to the Royal Veterinary College. London.



New Judging Pavilion, Veterinary School, Utrecht, Holland.

Building for Surgical Clinics, Hanover.

of any water, provender, oil-cake or other feeding material, or of the viscera and their contents of any of *his own* animals suspected of having been poisoned.

He may have the opinion of one of the professors without the payment of a fee as to the medicinal treatment of any of *his own* animals, brought for this purpose to the college, which he may desire to retain in his own keeping.

In cases of extensive or serious outbreaks of disease he may have an investigation made into its nature and causes with a view to its prevention or cure on payment of the fixed charges.

He may have a post-mortem examination of any animal, or parts of an animal, sent to the college, and receive an opinion of the probable cause of death on payment of a fixed charge.

The professors are not allowed to examine horses as to soundness out of the college, nor visit sick animals except by special permission of the principal or professor in charge, and then only for the purpose of consultation with a veterinary surgeon or with the object of the removal of patients to the infirmary for treatment.

The sick animals of the subscribers constitute the internal clinic of the college. This clinic is under the direction of Prof. Penberthy (medicine) and Prof. MacQueen (surgery), each professor having charge two days alternately. The students do not participate in this clinic to any extent except as onlookers. There is also an external clinic which is in charge of Prof. Woodruff (materia medica). There is a nominal charge of 1s. (25 cents) to enter the patients in this clinic. A great many cases are examined here and the students of the fourth year take an active part in performing minor operations and keeping records. Two hours in the forenoon and two in the afternoon are devoted to the clinics.

The tuition is twenty guineas a year (about $100). In addition there is a fee of one guinea to the library and reading room fund to be paid prior to entry, and a further fee of 10s. 6d. annually. The number of students in attendance is about 200, and the number is diminishing. It is believed by some that the decreasing attendance is due to the automobile bus service in London.

The veterinary school at Utrecht, under the directorship of Prof. Wirz, is the only school of its kind in Holland. Like the schools in England, it has a four-year course. There are quite extensive grounds with a number of buildings. There are about 140 students in attendance. The clinical hours are in the forenoon from 10 to 12. The clinics are free as to consultation and medicine, but there is a charge for the fodder that the animal consumes. I was informed that there was a good demand for veterinarians in Holland and that they did well.

Some idea of the work accomplished may be obtained by glancing over the following table, taken from the catalog of this school for 1904–5. The table represents the number of cases treated in each clinic during the period of one year.

	Stationary clinic.	Consulting clinic.	Ambulatory clinic.	Total.
Horses and asses	413	901	89	1403
Cattle	32	260	447	739
Sheep	—	5	1	6
Goats	12	57	3	72
Varkens (swine?)	—	27	11	38
Dogs	223	1413	2	1638
Cats	—	296	—	296
Birds	—	432	—	432
Other Animals	68	—	—	68
	748	3391	553	4692

At Hanover, Germany, I found a comparatively new and beautifully arranged veterinary school in its group of botanical gardens. It was under construction from 1895 to 1899, and I was informed that its cost amounted to 4,000,000 marks ($1,000,000). About twenty buildings are included in these grounds, and it indeed surpasses in beauty and extent some of the smaller universities in the United States.

The entrance requirements, as I understood it, are the same throughout Germany. A student must have passed through a gymnasium (about nine years) which corresponds to a high school education and that which precedes it in the States.

The length of the veterinary course is seven semesters of about five months each, or a total of three and a half years. The tuition per year at Hanover is 160 marks ($40). An eighth semester is devoted to final examinations for those who are eligible and able to complete the course. For this semester no tuition is charged.

The medical and surgical clinics under Professors Malkmus and Frick respectively, and the clinic for small animals under

Prof. Künneman, are well patronized. The students do not operate upon patients but study them, dress wounds and keep records of their progress. Subjects are purchased for the students to operate upon, and these are then utilized for dissection. In the clinic there is no charge made for consultation. Medicines are furnished at about 25 per cent. below the usual rates. A payment of 2 marks (50 cents) per day covers everything in the surgical clinic.

There are about 240 students in attendance at the Hanover School.

Military service is compulsory in Germany and veterinarians are not exempt from it. Because of their higher education, and this applies to medical and university students also, only one year is required instead of two years, as for ordinary individuals. A student must serve out his military term before he can embark in private practice. I was informed that the government would pay the expenses (not personal) of a student at a veterinary school and in return would require him to serve from seven to ten years as an army veterinarian—at least one year for each semester.

The veterinary school at Berlin leads all the others in the number of students, there being 335 in attendance. Berlin, I was informed, is a military school, and the students attending there are preparing for service as army veterinarians. The grounds of the Berlin school are about as extensive as those of Hanover, and there are numerous new and modern buildings. Some of the older buildings are to be replaced by new ones in the near future. A number of the professors live in a building situated upon the grounds. This is true to a much less extent of the majority of the schools visited in Germany—either a professor or some of the assistants being furnished with quarters.

In addition to the medical clinic under Prof. Fröhner and the surgical under Prof. Eberlein, and the clinic for small animals under Prof. Regenbogen, there is a very large polyclinic under Prof. Kärnbach. A great many animals are treated in these clinics.

Prof. Zuntz, Director of the Agricultural School, not far from the Veterinary School but independent of it, has done some important work upon the physiology of the domestic animals.

The tuition is the same as at Hanover, $40.

I was told as a matter of historical interest, that Virchow, as a young student, did some work at the Veterinary School, and it was there that he discovered the bacillus of malignant œdema. Also that Koch's discovery of the bacillus of tuberculosis and the comma bacillus occurred in a building situated near the veterinary grounds.

I am under considerable obligation to Prof. Ostertag and his assistant, Dr. Himpel, for courtesies rendered in making it possible for me to attend various lectures and clinics, not only in the Veterinary School, but in the University of Berlin as well.

The following data relating to attendance and cases presented at the clinics at Berlin was taken from the Veterinary Journal for September, 1907, and relates to the year 1905–6:

"During the summer session 400, and during the winter 416, students were on the roll of the school, and 21 military students. One hundred and ten presented themselves for the final examination, of whom 97 passed.

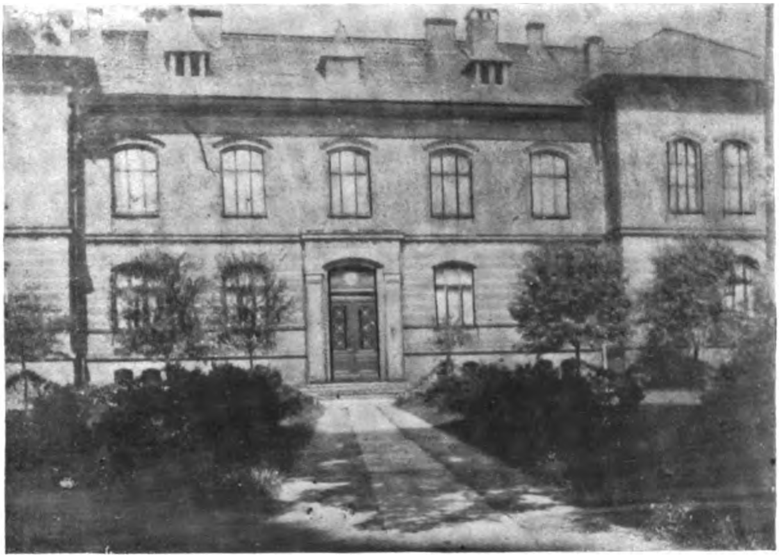
"One thousand seven hundred and twenty-seven horses and one donkey were treated in the medical wards under Prof. Fröhner, and 760 horses in the surgical under Prof. Eberlein. Six hundred operations were performed. Six thousand nine hundred and thirteen large animals were attended as out-patients under Prof. Kärnbach and 1908 minor operations were performed. In the canine ward, under Prof. Regenbogen, 1260 patients were treated and 244 operations were performed. Eight thousand dogs, 181 cats and 14 monkeys were attended as out-patients, and 632 minor operations were performed.

"Post-mortem examinations were made by Prof. Schütz on 305 horses, 1 donkey, 2 oxen, and 113 dogs. Prof. Eggeling paid 453 visits and treated 52 horses, 486 oxen, 561 pigs and 3 goats."

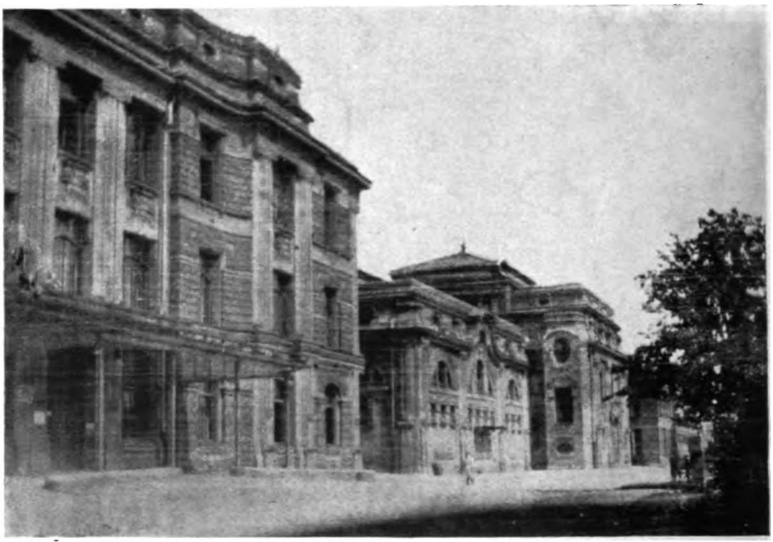
The grand total of all the animals treated in the various clinics amounts to 20,017.

The veterinary school at Dresden, under the directorship of Prof. Ellenberger, is not so extensive as those at Berlin and Hanover, but the buildings are well appointed and conveniently arranged. In a building upon, or adjoining the grounds, reside veterinarians in the military service who take a course of about six months in horseshoeing and the forge under Prof. Lungwitz.

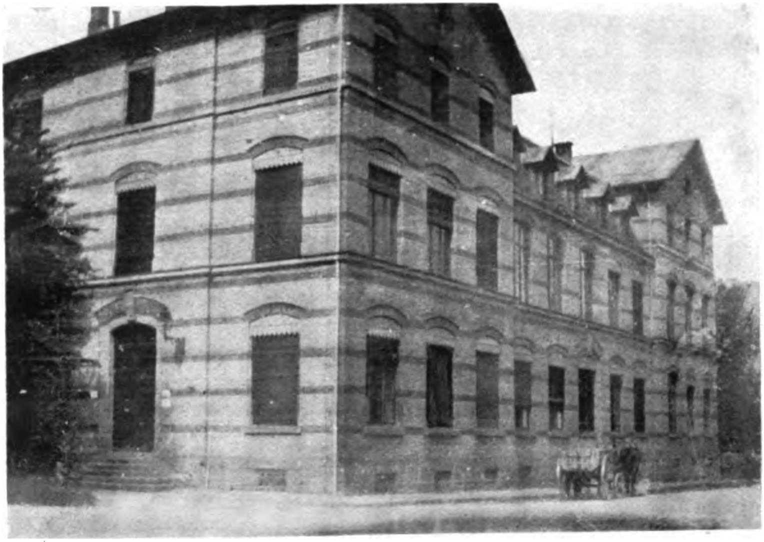
The clinics are conducted on a plan similar to that at Berlin, but the charges for the patients are somewhat less. There are about 167 students in attendance. The tuition is 160 marks ($40) per year with 10 or 12 marks additional for special purposes.



Institute for Pathology, Berlin.



Buildings for Medical and Surgical Clinics, Munich.



Building for Anatomy and Pathology, Stuttgart.

Administration Building, Lecture Room, etc. (Rear) Zürich.

The veterinary school at Munich, with Prof. Albrecht as director, has buildings somewhat older than the other German schools, but they are well equipped and arranged. The building containing the pathologic collection of Prof. Kitt is the most antiquated, but the collection is most interesting. I was informed that Prof. Kitt had recently been retired on account of disability.

The tuition charges are only 60 marks ($15) a year at this school and the clinical charges were also lower than at the other schools. The attendance is about 320.

According to the catalog for 1905–6 the Munich School received the following number of animals in their various clinics:

	Horses	Ruminants	Carnivora and herbivora	Swine	Dogs	Carnivora	Cats	Birds	Birds and other animals	Total
Medical clinics	312	3	...	23	797	...	39	59	...	1233
Surgical clinic: Large animals diseased	549	22	...	51	...	...	...	...	...	622
(operated upon)	(412)	(21)	...	(51)						
Surgical clinic: Small animals diseased	...	...	23	...	...	1032	...	...	32	1087
(operated upon)	...	...	(20)	...	...	(712)	...	...	(20)	
Polyclinic: Surgical division	6	...	...	...	1831	...	78	...	52	1967
Polyclinic: Medical division	36	...	...	...	2419	...	148	...	213	2816
Ambulatory clinic	194	618	...	1081	...	111	...	...	89	2093

The veterinary school at Stuttgart, under the directorship of Prof. Süssdorf, has grounds about as extensive as those at Dresden and Munich. Some of the buildings are quite antiquated, but the Institute of Anatomy and Pathology and the departments of Medicine and Surgery are well quartered in relatively new and commodious buildings. There is quite an elaborate system for ventilating the hospital wards of both of these departments. The department of surgery under Prof. Hoffman shows a wonderful range of mechanical ingenuity in the arrangement and manipulation of its apparatus. There is an elaborate operating table regulated by hydraulic pressure. It may be turned to a vertical or horizontal position or tilted to any angle and may be raised or lowered by means of a lever. There is also an elaborate apparatus for confining a horse by means of a system of clamps for the head and neck, the feet being fastened to the floor. A large

Roentgen-ray apparatus is also included in the equipment. The stalls are most conveniently and hygienically arranged for the comfort of the patients. Water is supplied to each stall automatically through a pipe so that the patient has always a supply before him. There are from 120 to 150 students at this school, and the tuition is 140 marks ($35) per year.

It was a matter of much regret that time did not permit me to visit the veterinary school at Giessen. I was informed that it had quite a close relationship to the medical department of the University—more so than any other school in Germany.

In Switzerland, the first school that I visited was at Zürich. Unfortunately, the season for instruction ended at about the time I was there, and I was unable to witness the work and meet as many of the professors during the remainder of the trip as previously.

This school is affiliated with the University of Zürich, although the school buildings are some distance from it. There is no separate director of the school, the president or director of the University officiating as such. A portion of the course including botany, zoölogy, physics, chemistry and physiology is therefore given at the University. The veterinary faculty is included with that of the University. The school is small, including only 35 students, and the buildings are somewhat old. The entrance requirements for the schools in Switzerland are similar to those in Germany.

There is also compulsory military service in Switzerland. It differs in some interesting ways from that in Germany, so far as veterinarians are concerned. As it was explained to me, the young man, while still a student, must serve in the recruit school, devoting eight weeks to military service if in the artillery, or twelve weeks if in the cavalry. If he wishes to maintain some connection with the army, he attends the under-officer's school (optional) for five weeks for the artillery branch. Then comes the officer's school (also optional) after the State examination, where he spends six weeks. Then he becomes an officer-lieutenant and must serve eight weeks if in the artillery or twelve weeks if in the cavalry. After the officer's school comes what is known as the "Wiederholens Kurs" (repetition) and the lieutenant must serve every second year for three weeks until he is thirty-two years of age. A lieutenant gets six francs, or $1.20 a day while serving.

The following report of the clinical work at Zürich for 1906 was furnished me during my visit:

	Hospital clinic.	Ambulatory clinic.	Consulting clinic.	Total
Horses	921	1089	3474	5498
Asses and mules	1	—	13	
Cattle	38	1626	76	1740
Swine	2	92	205	299
Goats	—	8	3	12
Sheep	—	1	—	
Dogs	563	163	1933	2659
Cats	5	12	264	281
Fowls	—	47	10	84
Parrots	1	1	2	
Other birds	1	—	22	
Rabbits	1	—	10	14
Guinea pigs	—	—	2	
Squirrel	—	—	1	

The remaining Swiss Veterinary School is at Berne and is affiliated with the University of that city, although the buildings are separate. This school is larger than the one at Zürich, having 45 students. The grounds are somewhat larger and the buildings are more modern and commodious.

The veterinary faculty is included with the University faculty. The Swiss, like the other schools, have clinical periods during the forenoon. The tuition in both schools is from 200 to 300 francs ($40 to $50) per year. The course in both schools is four years long.

Through the kindness of Dr. Liautard, who accompanied me, I obtained a very fair idea of the school at Alfort, Paris, although the work of instruction had ceased. The grounds with their pleasant groves and numerous buildings are very extensive and contain statues of Bourgelat and Bouley and a bust of Nocard. A few of the older buildings still remain.

The clinic continues through the vacation and presented a scene of considerable activity at the time of my visit, many of the students remaining to assist. There are between 250 and 300 students in attendance and they take their clinical work during the third and fourth years of their course. The rates are very cheap at this school, as I was informed that a student could get his veterinary education and living on the payment of something like 450 francs ($90) per year. There is a dormitory for the students upon the grounds.

On a second visit to the school, I met a Chinese student who informed me that his government sent him there and paid his expenses, and that when he returned he would be the first veterinarian in China.

I was informed that the Alfort School is supported by the government under the Secretary of Agriculture and gets an annual appropriation of $175,000.

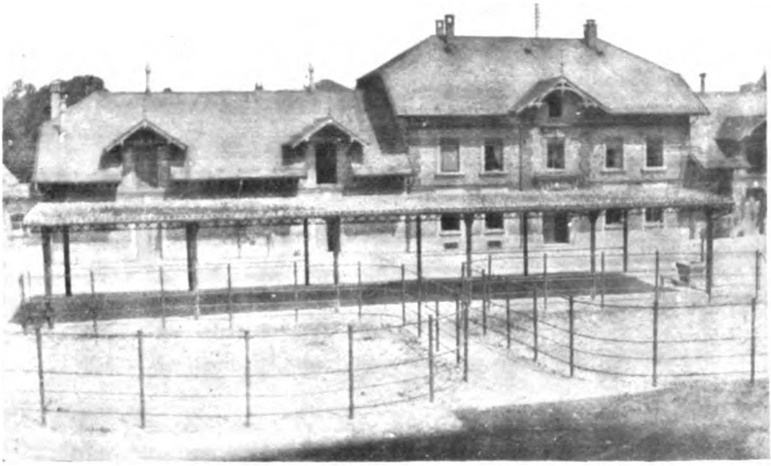
As in Germany, military service is also compulsory in France, but apparently no allowance is made for the veterinary education, as I was told that the veterinarian must spend two years in the army either as an army veterinarian or common soldier.

The veterinary school at Brussels, Belgium, under the directorship of Professor DeGive, is evidently an old school, and there is a larger proportion of old buildings here, with perhaps the exception of Zürich, than the other schools visited. I was informed that the course in this school is six years in length, the first two years being taken in the University, and that such subjects as botany, physics, zoölogy, psychology are taken there, and the remaining four years are spent in the veterinary school. Or if the four years in the veterinary school are regarded as the period of professional work, then it may be accepted that the two years of university work are required for entrance to the veterinary school.

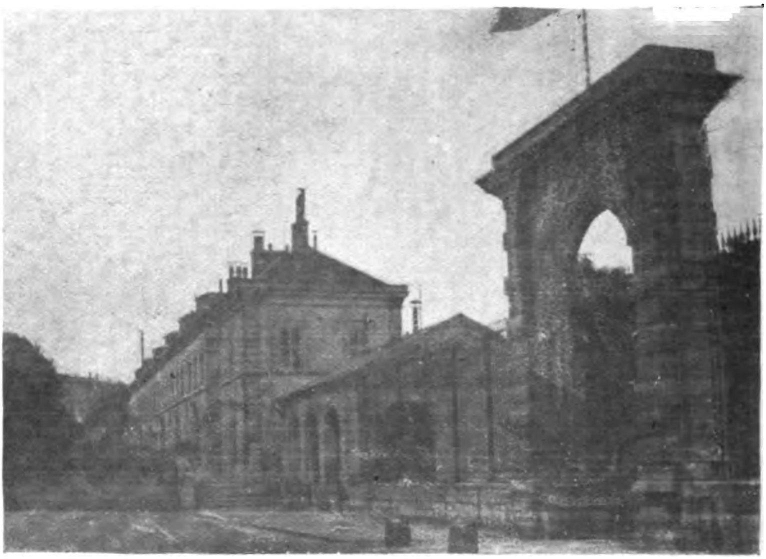
The tuition is 300 francs ($60) per year, with an additional charge of 20 to 60 francs ($4 to $12) for laboratory fees. There are 150 students in attendance. It is entirely optional whether the student shall go into the army or not, as veterinary military service is not compulsory in Belgium.

One of the facts, I think, which impresses the American visitor to the veterinary schools on the continent, is their extensiveness; the grounds are spacious and there are numerous buildings upon them. A single building for one or two departments with their laboratories and museums being larger than the whole equipment in some of the American schools.

Governmental support of schools, as it exists in Germany, is conducive to a high degree of efficiency. Some of the advantages are: uniformity of entrance requirements; none but well educated and qualified veterinarians are in practice. An illegal practitioner is, I judge, a *rara avis* in that country. With practically the same regulations, the system of instruction is interchangeable, and a student may transfer from one college to



Veterinary Hospital and Grounds, Berne.



Entrance to the Alfort School, with Administration Building in the distance.

Building for Veterinary Anatomy, Brussels.

another without loss of time or credit. In some instances living quarters are given to the teachers in addition to their salaries.

The methods of instruction of the German schools I visited while in session, attending lectures, clinics, etc., are, I understand, typical of the others. According to the schedule some of the work begins at seven o'clock in the morning and some continues until six P.M. In none of the lectures which I attended, although present promptly on the hour, did any of the lecturers begin until from fifteen to twenty-five minutes after the hour had struck. This long delay is customary throughout Germany in other branches as well as the veterinary.

There is not, as I observed it, the paternal interest in the student as in America. The German system of having the chief examinations at the end of the course—apparently on the plan of "pay when you get through"—results in quite a large percentage of students not getting through at the scheduled time, because of dilatoriness and not keeping up to the mark. This again is a custom which is prevalent in Germany in the universities as well as veterinary schools.

Although the schools are well provided with laboratories and they are finely equipped, and although they are used for research by assistants or advanced students, the idea was impressed upon me that the laboratory courses for the *undergraduate* students could stand a higher degree of development in such branches; for example, as physiology, pathology and bacteriology.

In France, although the government is generous in its appropriation to the Alfort School, the conditions surrounding the veterinarians in practice are not of the most desirable. I was informed that practice in veterinary medicine was practically open to any one who wished to take it up. Veterinarians from other countries may settle in France without let or hindrance, which is no disadvantage if they are properly qualified. But the absence of legal restrictions, except in connection with outbreaks of contagious or infectious diseases, against unqualified persons taking up the practice of veterinary medicine, is a condition which can have no other effect than to retard veterinary progress in that country.

The veterinary schools in Holland and Switzerland appear to follow more or less closely the methods of Germany, while the school in Belgium is apparently more like those in France.

The European schools have the prestige of age. The first veterinary school was founded at Lyons, France, in 1762. Other schools were established soon afterwards; one appeared at Alfort in 1765; others at Copenhagen in 1773; at Dresden in 1774; at Vienna in 1777; at Hanover in 1778; at Budapest in 1786; at Berlin and Munich in 1790; at London and Milan in 1791, and at Madrid in 1793.

Although earlier attempts may have occurred, the first successful establishment of a veterinary school in America was that of the New York College of Veterinary Surgeons, which was chartered in 1857. The Ontario Veterinary College at Toronto, Canada, was established in 1862 and the American Veterinary College in 1875. Since then others have been established, some of them with State support, but the proportion of the number of veterinary schools to that of the general population is still apparently less in America as compared with Europe. Relatively, veterinary science is young in this country, and the prestige of years and adequate financial and government support are still to be attained.

THE PLACE OF VETERINARY MEDICINE IN STATE EDUCATION.

BY D. ARTHUR HUGHES, PH.D., D.V.M.,
Inspector, Subsistence Department, U. S. Army, Chicago.

The German poet Heinrich Heine, somewhere in his writings, importunes men not to neglect to hearken to the Zeit-Geist, the Time Spirit, if they are to make their energies potential in their day and generation. For my part I do not pretend to have anything of prophesy in me, nor come I from a "school of the prophets." Hence I do not dare to predict what the honeyed future may have in store for us. Nevertheless the part of wisdom is to consider what the politicians call "the issues of the day," which, for us, are the veterinary issues of the day, leaving to posterity the fruits of our labor.

Of all the questions which vex us, governmental and legal ones most concern us. Look at them! The military veterinarian has not his right status; for the reason given that the government does not yet appreciate his full worth. Fakirs and quacks are abroad in the land; for the reason given that state governments do not put an iron hand on them. Practitioners in the States are not at all sufficiently protected; because of the reason given that the state legislatures have not passed adequate laws. Veterinary sanitary police work in the States is insufficient; for the reason given that legislative authority granted to us is wanting. Many of the States make no provision for the training of veterinarians; for the reason that the legislatures are yet dead as door nails to its necessity.

If it were not that the American Government, from its foundation, has stood fast for public education; if it were not that agricultural education was knit, by Congressional enactments, into the warp and woof of that public education; if it were not that, in those fundamental Congressional Acts, veterinary medicine was mentioned as a cardinal subject for training; if it were not that veterinary science has thus found its place in the state agricultural education adopted, I would be able to find no reasonable ground for hope that veterinary science would shortly find a larger scope in the several States, and that, eventually, most of them would have veterinary courses in their state institutions for the training of veterinarians. But veterinary medicine has found its place in state education. At least nine States, New York, Pennsylvania, Ohio, Michigan, Kansas, Iowa, Colorado, Washington and Alabama have declared themselves prepared to train their own veterinarians. As many more States could be named, which, by virtue of the commendable zeal of their veterinary leaders at the state colleges or universities, have veterinary courses even now, which, when taken together with collateral sciences electable at the same institutions, would give a better training than that obtainable in some "recognized" veterinary colleges, though these state institutions have not yet declared themselves ready to train their own veterinarians. I refer to such States as Virginia, Texas, Missouri, North Dakota, Minnesota and Wisconsin. The signs of the times point to the establishment of full veterinary courses in these or other state institutions where the field is ripe for a change. No other governmental question, therefore, more deserves the attention of this assembly than that which constitutes my theme, "The Place of Veterinary Medicine in State Education."

This brings me to the proposition I wish to advance this morning, namely, that it is the duty of each State to train its own veterinarians; to define the conditions under which they shall be allowed to enter upon veterinary work within the State, or remain in that work; to defend their interests by legislative enactment.

Through the leavening effect of the work of men of this profession, the conviction is becoming deep-seated in the minds of the American people, in many of the more enlightened States, that veterinary education should be free; that veterinary knowledge should be imparted at state institutions; that a degree in veterinary medicine should be conferred; and that professional men should be turned out therefrom to treat farm animals. To show you that this view is not chimerical, I point to the fact that the State of Michigan has, within a few weeks, empowered its Secretary of Agriculture to start a veterinary department, in connection with its famous College of Agriculture, and a course leading to the veterinary degree. Earlier in the year, Alabama and Colorado did much the same thing, both of which will establish veterinary courses leading to the degree in 1907. It is patent that, in so doing, these States were only doing their bounden duty to the agricultural interests. A survey of the present tendencies in public education in the United States will discover to any thoughtful man that state veterinary education, whereby men will be trained for work within the States, will be accomplished either by adding a Department of Veterinary Science at the State Agricultural College, as in Iowa, Alabama, Colorado, Michigan and Washington; or by establishing a separate State Veterinary College under the Trustees of the State University, as was done in New York and Ohio; or by adding a Department of Veterinary Medicine at a State University, as was done in Pennsylvania.

State veterinary institutions, moreover, seem at present to receive the smiles and blandishments of fortune; whereas she refuses just now to coquette with any other form of veterinary school. It is conceivable that private veterinary schools might be placed beyond criticism, even by a man like Dr. Merillat, who knows them so well, provided they could be made the recipient of a large endowment from philanthropists, in the same manner as great schools of human medicine have been endowed. Their fortune being assured, from interest on endowment and student fees, they might be able to pass muster, even before the eyes of the acutest critic. If this could be done, every man in this assembly would throw up his hat with joy. I would throw up my own hat, higher than any one. Unfortunately, as far as I can learn, not one of them but must depend upon student fees for existence, for all have yet failed to successfully appeal to the purse of the rich. On the other hand the library of the State Veterinary College of New York received $15,000 from the estate of the late Governor Flower towards its endowment, and the Veterinary Department of the University of Pennsylvania recently received $150,000 from private sources for use as an endowment fund. The site for the new buildings cost $50,000 which was provided by the university. The State has given additionally $200,000. In other words, the idea of state veterinary education appeals to the rich as well as to the general public.

These fortunate events do not come haphazard. They are the result of untiring labors of zealous veterinarians, who count no professional effort as loss, but who press onward towards the materialization of their ideals in the foundation of state veterinary institutions to stand as monuments to their renown for veterinary learning and in veterinary education. Therefore it was to our credit that, a few years ago, we made Dr. Leonard Pearson our chief executive officer; it was a graceful tribute to his zeal, that, last year we raised Dr. James Law to the presidency of this Association. Both are exemplars of State veterinary education and the immediate cause of the fortunate events of which I have just been speaking.

The foundation of state veterinary schools, in one form or another, comes as the fruition of many kinds of endeavor.

My study, for the last eight months, of the subject, "What the several States are doing for the furtherance of veterinary intelligence and education," has convinced me that through its encouragement by the Morrill Land Grant Act, the Hatch Act and the Adams Act of every kind of agricultural education and investigation, the National Government has, among other things, been, in a large way, cultivating and fostering veterinary intelligence in the States, royally and with lavish hands. Through the Federal funds, disbursed to each State by virtue of these Acts, the States have been enabled to provide teachers of veterinary science in state institutions, investigators of veterinary science in the Experiment Stations. Scholastic and popular state veterinary education has grown up. Through the *scholastic* veterinary work, at the agricultural colleges, thousands of students yearly have received a more comprehensive view of the field of veterinary science and its purposes. Through the *popular* state veterinary education, by the medium of popular veterinary publications and the lecture platform, the remotest parts of the States have been reached by veterinary intelligence. Thus it has come to pass that the Professor of Veterinary Science at the state institutions has become a person whose opinions have been weighty in veterinary legislation.

But the Federal veterinary agencies, so acceptable to the States, have not been the only causative factor in the upspring of professional veterinary courses in state institutions. The history of each State shows that, where fakirs and quacks abounded, graduate veterinarians soon appeared to displace them. As time progressed State veterinary associations were founded, shortly gained in numbers and power, which became virile and coercive in the State Legislature. Thus, by agencies at work along many avenues, State legislatures have come to voice State needs in the foundation of professional veterinary courses in State institutions. However, when all these lines of force are about to have definite effect in legislation, one man usually stands out as leader, or immediate cause of legislative enactment, Law in New York, Pearson in Pennsylvania, Glover in Colorado, Schoenleber in Kansas, Nelson in Washington.

In contrast to this, we have the proposed state veterinary school in Chicago, which, report says, is to come into existence under the auspices of the University of Illinois, the land and buildings for which are to come from the packing firms, the financial support from the State of Illinois. Here a state veterinary institution springs into being as the result of a national movement making for reform in the packing industry. The endeavor is to put to silence that European criticism of American veterinary inspection, which may have been sincere, by the foundation of a school to train veterinary inspectors for the public service, in the centre of the American trade, unhampered for money, under state control.

Whatever way the end, state veterinary education is accomplished, matters not. Overtures have been made by at least three private veterinary schools to be taken over by the State, but in only one case were they successful. The reason for this is that the States usually prefer, for the sake of economy and expediency, to open departments of veterinary science leading to a degree in state colleges or universities already founded. Hence the chances are, as illustrated in the case of Michigan, that it is easy to bring about the foundation of a veterinary department in a state agricultural college, which thereby becomes more useful to the animal industry of the State. Whether the course be established in a state agricultural college, or in a state university, in country or city, the same end, in the long run, is gained; for the veterinary course established will be considered equivalent to any other course of similar grade in the institution and would be conducted with the same dignity. When state veterinary education once becomes established, the relation of the State to the veterinarians trained by it is altered. The bearer of a state diploma would likely be the recipient of professional favors and preferences. The State vouches for the diploma and the man.

However, additionally, it is the duty of each State to define the conditions under which men shall be allowed to enter veterinary work within the State, or remain in that work, and to defend their interests by legislative enactment. It is the sovereign right of the people of each State to declare, through its legislative representatives, who shall be the proper persons to practice veterinary medicine and under what terms. This cannot be determined, as in France or Great Britain, by national legislation. We have, here in America, no right granted in the Federal Constitution, permitting Congress to found veterinary schools, as has been done in France, expressly to fit veterinarians for general practice or whatever other veterinary work to which they may wish to turn their hand. However, though the question has never seriously arisen in the American daily press, it would be permissible for Congress to found and endow national veterinary colleges for the purpose of supplying efficient men for the Departments of Agriculture or War, for the veterinary inspection service of the Department of Agriculture or the Army. There always will, therefore, be differences between the law granting right to practice veterinary medicine in one State, and that in another. The dissimilarity is inevitable, because of differing conditions in the animal industry of each State, and because of different evils to be met by the law. Nevertheless, the movement for State veterinary education will have a tendency to lessen the evils against which veterinary practice laws are usually directed; while, at the same time, it dissipates the present disparity between the States when a man, legally registered in one State, wishes to practice in another.

The two chief evils against which veterinary practice laws are directed are: first, quackery, the ignorant and barbarous practice of entirely incompetent men upon sick animals; second, lesser incompetency, the exclusion of men, much better prepared than quacks, but whose knowledge, judged by the veterinary standards of the State concerned, is not sufficient to warrant their being permitted to practice. The preparation of men, through veterinary education in state institutions, for work in the State, means that the State recognizes the ignorance prevailing, its duty to supply men for practice, and the necessity to safeguard its flocks and herds through veterinary enlightenment radiating from its own institutions. Where state professional veterinary education is not conducted we are apt to find an elysium for quacks and lesser incompetents. With the establishment of state veterinary education and its growing strength, we are apt to find strong veterinary practice laws and war to the knife against quackery and lesser incompetency. This is the reason, for example, why Kansas this year, with one hand gives $70,000 for a veterinary building at its State Agricultural College, and with the other, a veterinary practice law to control the ignorant. This is also the reason why Michigan, this spring, one day passes a veterinary practice law, the next makes way for a full veterinary course to be established at the State Agricultural College.

Far be it from me to declare that state veterinary education is a panacea for all evils found in veterinary practice in the several States. Yet it is tenable that, when public opinion in its might is once aroused in a State at the danger of allowing ignorant men to pass judgment in case of animal plagues, or to tamper with animals in disease, reforms inevitably ensue. The only rational conclusion to be arrived at is that the State control practice, educate veterinarians for its public service, and make all amenable to the penalties for breach of the law.

Furthermore, any one who has studied such a book as that by Francis M. Thorpe, formerly professor in the University of Pennsylvania, " The Constitutional History of the States," which is an authority on that subject, or has made a simple comparison of the Constitution of one of the American States with that of another, will know that there are great differences in the expression in State Constitutions of what are believed to be state rights. In the formation of law, therefore, relating to veterinary education and practice, the people of one State will, in the exercise of their sovereign power through legislation, express very differently their desires than those in another. This is the reason why there are many differences in the practice laws, why each State may choose the place where state veterinary training shall be conducted, whether at an agricultural college or other state institution, and why the courses offered would differ. For the same reason, just as the States, as a rule, do not allow a man with a medical diploma from a medical school outside the State, or a license to practice in another State, except in certain exigencies, to practice in their own State until he has passed their own examination, so also it is not to be supposed that a veterinary medical diploma or license acceptable to, or granted in, one State will be acceptable in another. The veterinary medical laws will always be stricter in some States than in others, just as medical laws are stricter in one State than another.

Notwithstanding that, state veterinary education tends to the equalization of veterinary courses in one State and the other, and so to bring about that *entente cordiale,* that *concordat generale,* which we all so strongly wish. The professors in the state institutions, who give all their time to their students and are under obligation to the State to bring them up to its veterinary standards, will train the men according to the most recent methods in the veterinary art, and in the most recent veterinary knowledge. With the provision of adequate funds by the States, eventually the veterinary institutions of each State will differ but little the one from the other; nor will students of one state institution be much to be preferred over those graduated in another.

It matters little in Great Britain whether a man has taken his veterinary course in the Royal Veterinary College, Dublin, the Royal (Dick) Veterinary College, Edinburgh, the University of Liverpool, or the Royal Veterinary College, London—the entrance requirements for each are the same, the courses substantially the same, the requirements for practice the same, and each man receives the appellation M.R.C.V.S., when he has passed the final examinations. It matters little in France whether a man has had his veterinary training at Alfort, Lyons or Toulouse, for matriculation, curricula and requirements for license are uniform. It matters not in Germany whether a man has been trained in the Veterinary High School of Giessen, Hanover, Strassburg or Berlin, as the requirements in each are similar. In each of these countries the secret of uniformity is that it has been accomplished by national legislation; this is true, at least, in Great Britain and in France.

In America the Central Government has no authority to bring about such a uniformity, nor even similarity, in veterinary matriculation, curricula, degree and requirements for practice. The American Veterinary Medical Association contains most of the master minds of the American branch of the profession. But the moral force which we can exert to foster our ideals in regard to raising the standard of veterinary education in America has the same weakness as that found by historians and students of statecraft in the Continental Congress at the time of the War for American Independence, 1776. We cannot coerce; we can only show the need for change, not impose our ideas, individually or collectively, on the States. We lack effective authority. However we have moral force, and that is much. We should use it to originate legislation for the foundation of state professional veterinary education, being assured that the moral force thus spent will bear fruit a hundredfold as time goes on. The educational ideals of the American Veterinary Medical Association can be best expressed in the encouragement, through the agency of strong state veterinary medical associations, the puissance of the press, the might of public speech when occasion offers, the subtle and engaging influence of conversation with men in authority, of the foundation of veterinary departments in state institutions, in which the matriculation requirements, curricula, requirements for graduation and right to practice, may be equivalent to those at the better state veterinary institutions already established. When once established, the force of popular opinion within the State in favor of state veterinary education, fostered by the State Veterinary Association and the exhibition of mental and moral energies, grandly displayed, through the obligation of the veterinary teachers to the State they serve, will be sufficient stimuli to assure the production of veterinarians of the right stamp in each State.

DISCUSSION.

Dr. Hoskins: Mr. President, I listened with a great deal of pleasure to the splendid paper presented by Dr. Hughes, and especially with reference to the high ideals which he presented before us. I listened also with much pleasure and interest to the account which Dr. Fish presented of the veterinary schools in Europe, and also to the many statistics that he furnished as to the cost of veterinary education in Europe as compared with the cost in this country. There is one side of the question in this country which appeals very strongly to me, and it must appeal very strongly to others of the profession, if we are going to obtain the rank in this country that veterinary education must soon command. We have in Canada and in the states about six thousand veterinarians. I think the list in my office reaches nearly to seven thousand names, and with the exception of the Province of Manitoba I have never known of any veterinarian to be a member of a state legislature or of Parliament. In Manitoba, two of our practicing veterinarians entered Parliament some years ago, Dr. Torrance and Dr. Rutherford, and they posed there as representatives of the profession, and there having the opportunity to raise their voices in behalf of the profession, recommended and helped to secure the passage of some of the best legislation for controlling and guaranteeing the qualifications of practicing veterinarians that exists in any province or in any state of America. I take it we must look forward to some of our men going into the legislatures of our states for the purpose of standing up and presenting the conditions of veterinary education in our states, and in that way to obtain that recognition and support from the various states that veterinary education must command very soon. We have been fairly successful in obtaining recognition in Pennsylvania, and in obtaining sums of money for various lines of work, but we do not feel that we have received anywhere near what we want, and we are going in the next legislature to attempt to send one of our members as one of the senators so that he may stand in the legislature as one who is going to advocate all that which is good, and which is really required for the proper protection and advancement of veterinary interests in the state of Pennsylvania. He will endeavor to so present the claims of the veterinary interests and if possible, to induce the state to give to us what belongs to us in Pennsylvania, and what the veterinary profession must have if it is to be put upon the basis that it deserves. I do not know that you take this practical aspect of it in any other states, but that is a thing that should be done to a much greater extent than it has been done heretofore. We are strong. Our men are well enough educated, and they know what the profession requires, and realize its importance to the public, and if they are afforded an opportunity of advocating the needs of the profession before these bodies, I am sure that we will receive that recognition which we should from the state. If we can send men to our state legislatures, we may hope to send others to represent us in the federal Congress, and there obtain the support from the federal government which veterinary education demands in this country.

INTESTINAL OBSTRUCTIONS IN THE HORSE.

By A. H. BAKER, V.S.,
Chicago, Ill.

Under this head I am going to present for your consideration a series of painful affections with such a similarity of symptoms as to make a differential diagnosis very difficult. In the discussion, that I trust will follow, some experiences and observations may be expressed that will lead to a more comprehensive differentiation than has heretofore been considered possible. The rationality of treatment will also be considered.

For systematic consideration we will divide the cases into acute and subacute. The acute develop suddenly, run a rapid course and terminate fatally, usually in ten to twenty hours. The subacute come on slowly, develop slowly, and usually terminate favorably in six hours to as many days, or fatally in two to five days.

The acute cases due to obstructions include those produced by calculi, intussusception, volvulus, and hernia and strangulation. The subacute include dust balls, impaction by coarse innutritious fodder with an insufficient water supply in winter, and dry seasons at pasture, Chinese lettuce, paresis of the colon and rectum, tumors pressing on the gut or growing inside of it, stricture and parasites.

The Acute.—A *calculus* obstructs by rolling out of the pocket that has contained it since its inception. This is probably brought about by the horse rolling, or possibly the position of the portion of the gut containing the calculus is changed sufficiently while lying down to permit of the peristalsis driving it out. If large it may completely obstruct the passage. In any case, once removed from its pocket, it comes in contact with mucous membrane unaccustomed to carrying it and sets up an irritation and congestion that, if not removed, will terminate in a fatal enteritis. If complete obstruction occurs distress with acute pain, straining in an effort to defecate, lying down and getting up, pawing, sweating and tympanites are seen. Forcible resistance to the introduction of the hand in the rectum is made. The calculus is usually located in some part of the colon, consequently borborygmus can be heard in the small bowels, but not in the large. In the course of a couple of hours the pulse increases in frequency, decreases in size and compressibility, and becomes small, rapid, wiry and indistinct by the time six hours have passed. The temperature runs up rapidly to 105° or 106° F., and the mucous membranes become syanotic. As death approaches the caput and other muscles tremble. It is possible in some cases to diagnose the case correctly by rectal examination. If it is within reach a distinctly hard tumor will be felt. This case runs its course in twenty-four to forty hours.

Intussusception is invagination of one gut into another part of itself. This is comparatively common, especially invagination of one part into another part of the same gut; for instance, the slipping of a portion of the ileum into itself, while slipping of a portion of the ileum through the ileo-cæcal valve is seen occasionally, and invagination of the cæcum into the colon is rather rare. Within the last year half a dozen cases of intussusception have come under my notice, one being of the cæcum into the colon, the others were of a portion of the ileum into itself. From philosophical reasoning the only way this can occur is by a portion of the gut dilating; then the peristaltic motion drives the normal part into the dilated part. From pathological reasoning the dilated part is relaxed by nervous depression or partial paralysis, or is distended by a little local flatulence from undue fermentation. The probabilities are that in most cases the former condition exists, proven by the extent of the invaginated portion which is sometimes as great as twenty feet of the ileum forced into six feet of the succeeding part. This accident creates local excitement in the normal portion and increased peristaltic motion, which drives it in to the extent of complete impaction. This impaction, together with the unnatural position of the parts, creates strangulation of the invaginated portion.

In the horse this is fatal in fifteen to twenty hours. In cattle sloughing sometimes occurs near the anterior fold, and two serous surfaces coming in contact, grow together, the detached part passes on, and recovery follows in three to four weeks.

In case the cæcum passes into the colon, the latter is not so completely filled, strangulation does not take place so promptly nor extensively, congestion with an excessive amount of œdema develops with more or less inflammation, and death follows in thirty to sixty hours. The œdematous walls of the cæcum are about two inches thick with upwards of a gallon of serum in the gut. In case it is the ileum that is involved borborygmus in the small bowels will be almost entirely suspended, but in the case of the cæcum very slight change in this respect will be noticed.

Volvulus, twist, or tie occurs in two ways,—first, and most often by a rupture of the mesentery and passage of a portion of the small intestines, usually the ileum, through it, constituting a mesenteric hernia with a portion of the gut thrown over itself; second, by a portion twisting round and round, forming a bunch of intestines with a rope-like neck. In both cases fatal strangulation occurs.

Another *hernia* that cannot be seen nor felt may be included in this connection—viz., diaphragmatic hernia, in which case a portion of the small intestines passes through a rupture in the diaphragm into the thorax, with strangulation naturally resulting. The symptoms of these troubles are practically the same as those of obstruction by calculi. No differential diagnosis can positively be made, and the true character of the lesions is revealed only by a post-mortem.

The Subacute.—Dust balls are composed of the hulls and chaff of the various kinds of grain, beards of barley or wheat, and dust, all held together with hair. These exist usually in numbers, and do little or no harm, on account of their light weight, unless they grow to great size, in which case they produce a fatal obstruction. They are usually found in the colon, but might form in the ileum.

Impaction from coarse innutritious fodder and an insufficient water supply in winter occurs in horses wintering in barnyards, and in horses at pasture in long dry seasons, when the streams dry up and the dew is slight. As an additional cause for the development of this condition is an excessive absorption of the sucus entericus. Impaction with Chinese lettuce occurs when horses eat this herb, roots and all, and, it being largely indigestible, becomes matted and intertwined so as to make an obstructing mass, usually in the colon.

Paresis of the colon and rectum occurs in city horses that are highly fed on oats and timothy hay continuously for a long time without bran or change of fodder. The portion of the sympathetic supplying the colon or rectum, usually the colon, or both, becomes tired as it were, and peristalsis suddenly ceases, leaving the contents of those bowels quiet. As soon as this occurs trouble begins. Irritation slowly develops, producing congestion that runs into inflammation and terminates fatally.

Parasites, when occurring in large enough numbers, produce fatal obstructions. Bots have been known to obstruct the pylorus and small bowels in various parts, especially at the ileo-cæcal valve. The ascaris megalocephala have at times congregated in a mass sufficiently large to completely obstruct the bowel.

The **symptoms** of these subacute cases are very similar. The more diagnostic are: absence of fecal matter, anorexia, inclination to lie a good deal, get up occasionally, turn around once or twice, paw a little and lie down again, pulse and temperature normal. This continues for twenty-four hours or more, then irritation begins, the pulse increases in frequency and the temperature rises slowly, he becomes more uneasy, gets up oftener, turns faster, paws more vigorously, pushes his rump against a partition, resists the introduction of the hand into the rectum and absence of borborygmus. By the fourth day the frequency of the pulse has risen to about 60 and the temperature about 104° F. On the fifth day the pulse will run about 80, and the temperature about 105° F. Symptoms of enteritis by this time are pretty well developed. Death occurs usually on the fifth or sixth day.

Tumors of various kinds in or on the outside of the bowels sometimes obstruct them, more or less filling the lumen, or pressing on the outside. Those most often seen are melanotic sarcoma, lipoma, fibroma, myoma and mixoma.

Stricture may occur anywhere in the intestinal tract, most often in the small bowels. The neoplasm reduces the calibre of the gut, sometimes to half an inch, and destroys its dilatability. This condition always causes the formation of a dilatation in the form of a pouch immediately anterior to it, where the ingesta accumulates, owing to the slow passage of it through the stricture. Symptoms suspicious of tumors or stricture are frequently recurring attacks of colic, and ultimate death by enteritis. Offending tumors can often be felt by a rectal exploration. Manual rectal exploration should always be resorted to, notwithstanding its disagreeable nature, in all obscure or doubtful cases, for it will often reveal information unobtainable by any other means.

Treatment.—The general principles underlying rational treatment must be directed, first, towards the evacuation of the contents of the bowels, with the object in view of dislodging and removing the obstruction; second, towards the alleviation of the pain; and, third, the reduction of the fever. The first object is best obtained by giving a purgative followed by stimulants. The second by giving an analgesic, and the third by an antipyretic.

The drugs and other remedies indicated are: raw linseed oil, eserin, arecolin, carbonate of ammonia, or the aromatic spirits, strychnine or nux vomica, ginger or capsicum, oil of turpentine, atropin, hyoscyamus, cannabis Indica, chloral hydrate, aconite, acetanilid, warm water and soap enemata, cold water enemata, and counter irritation. The applicability of these remedies, size of dose and frequency of repetition depend upon the character of the case.

In an acute case I would recommend this prescription:

℞ Ol. lini, one quart;
Ol. terebinthinæ, two ounces;
Strychninæ sulph., one grain;
Tr. zingiberis, one dram;
Fl. ex. cannabis Indica, one ounce.
Mix and give as one dose.

Give a warm soap and water enema. The latter may be repeated every hour. If necessary, after two hours the strychnine in half-grain dose and the ginger and the cannabis in half-ounce dose may be repeated; or this prescription may be given:

℞ Ammoniæ carbonatis, one ounce;
Nucis vomicæ pulv., half ounce.
Mix and give in bolus as one dose.

If after four hours no headway is being made, give half an ounce of cannabis and a grain and a half of eserin, the latter hypodermically, and a liberal sinapism over the abdomen, covering a large surface. If fever and a rapid, hard pulse develop, give a dram of acetanilid every hour, and the following prescription:

℞ F. E. aconit., one dram;
F. E. belladon., two drams;
F. E. hyoscyami, one ounce;
Spirit. etheris nitrosi, two ounces;
Aquæ, q. s. ad one pint.
Mix and give two ounces every hour. Later treatment as conditions indicate.

In a subacute case a little milder course is pursued. No anodyne is needed for two or three days, if at all, for the pain is not severe until the case is bordering on inflammation. Give the oil and turpentine the same as in the acute, and the soap and water enema three or four times a day. Two hours after the oil give ammonium carbonate two to three ounces, powdered nux vomica one ounce in capsules at one dose. After eight or ten hours, if necessary, give a grain and a half of eserin and half a grain of strychnine in solution hypodermically. In the course of six or eight hours more, if no results are obtained, give a grain of arecolin in solution subcutaneously. The raw oil should be repeated in pint doses night and morning. The eserin and strychnine together and the arecolin can be repeated every eight to twelve hours, alternating them until results are obtained.

To keep the owner pacified and the nurse busy, make a mixture of aconite, belladonna, ginger and hyoscyamus to be given in small doses every hour or two, and a sinapism to the belly night and morning. After three and a half to four days, if the temperature gets up to 104° F., give cold water enemata instead of the warm every four hours. This will reduce the fever and stimulate the bowels to increased activity. Enemata in all of these cases should be given through a hose and funnel. Insert the hose five or six feet. Given in this way more water can be introduced and it will stay longer than if given with a pump or syringe. Half an hour before giving a dose of eserin or arecolin always give half an ounce of fluid extract of cannabis Indica as an act of humanity, for both of them increase the pain while exerting their physiological action. Opium and morphine are strongly contraindicated.

THE FRENCH-CANADIAN BREED OF HORSES: ITS PAST, PRESENT, AND FUTURE.

By J. A. COUTURE, D.V.S.,
Secretary of the French-Canadian Horse Breeders' Association.

The French-Canadian horses (the Canadian ponies, as they were called in the early days) are descended from those sent out in the seventeenth century by Colbert, Minister of Louis XIV, to Canada (La Nouvelle, France). The first importation was made by the regiment of Carignan in 1665. We read in the annals of that time that Colbert had given special instructions to the Master of the Royal Stud to select for the new colony the best animals that could be found in the kingdom. We do not know exactly the race of those horses, but, judging by their size, the shape of their head, their remarkable activity and endurance, they must have had a good deal of the Arabian blood running in their veins.

Several other importations of the same race or breed of horses were made from France in the latter end of the seventeenth and the beginning of the eighteenth centuries and distributed among the colonists. In-and-in breeding could not be avoided, on account of the centres of the population being isolated from each other, and the French horse was kept in all its purity till about the middle of the nineteenth century. Towards 1840 the Morgan horse made his way into the country and was crossed with the French mares. There was not much harm in that, the Morgan horse being of the same type and stamp as the Canadian. Neither was there any harm in infusing into the latter a little English thoroughbred blood, as it occurred in the neighborhoods of Montreal and Quebec about the same time, through the English officers' mares being bought by civilians and bred to Canadian stallions.

The French-Canadian horse of fifty years ago was a remarkably good animal. He was small, measuring between 14 and 15 hands (exceptionally 15.2 for the stallion), weighing from 900 to 1100 pounds, the stallion dropping the scale sometimes at 1200 pounds. He was compact, had plenty of clean flat bones free from hereditary exostosis. Such a pretty square head as had the Canadian horse can only be seen on the Arabian. He had a clean throat, long but strongly muscled neck, barrel very well arched and well ribbed home. Thrifty, wiry, alert, possessed of great strength and endurance, he could travel a whole day at a swift pace and be fresh the next morning. As it was said of him then, he swam in snow. Stronger for his size and weight than any horse of the present day, he could be seen in the streets of Montreal and Quebec at spring time, pulling on mostly bare ground a *habitant* sleigh with a load of 1500 pounds in it.

He had his faults, of course; nothing is perfect in this world of ours. The withers was rather low and the rump rather drooping. Those defects in conformation were compensated by the strong, wiry muscles of the shoulder, arm and hind quarters.

The Canadian horse was very swift and had in him all the stuff of the present trotter. The fact is that he was, with the Morgan, the trotter of those days. Our American neighbors soon found that out, and bought our Canadian ponies in large numbers. But let us not anticipate.

Such was the Canadian horse of 1850. Canada had then a breed of horses of her own, a most useful one, admirably adapted to the country, and especially to the Province of Quebec, answering all purposes; a breed of horses which would, at present, make the fortune of her farmers had it only kept pure, sound and be improved by the proper selection so as to increase somewhat the size, straighten the hind quarters and raise the withers.

What has become of it? Some people will say that it is extinct, but that is not the case. The truth is that it has been partially destroyed, and what remained of it was bound to meet the same fate had not some conservative measures been taken some years ago. It was not too late, but it was high time.

The partial destruction of our French-Canadian breed of horses is due to two causes: first, the selling of our best stock (stallions and mares) to the Americans; second, its being crossed with heavy draught horses mostly of inferior quality.

In 1860 the American war broke out. Horses were in great demand in the United States, and our neighbors began to buy ours. Prices were low compared to those of the present day, but high in comparison to what they were before the war, and our people were always eager to sell every horse they could spare. They even sold some that could not be spared. It is thus that our best stallions and mares were sent across the line.

The Canadian pony soon made a reputation for speed, endurance, thriftiness, and after the war the Americans kept buying them, giving the preference to those showing speed. A very large number of French-Canadian mares, not to speak of some stallions, were used by the Americans to breed for speed. Indeed, the best blood of our French-Canadian horse is now running in the veins of the American trotter.

In the early sixties the Board of Agriculture of Lower Canada was established, in view, evidently, of promoting the agricultural interests of that part of this country which is now the Province of Quebec. Some of the most influential members of that body soon advocated with enthusiasm the so-called improvement of both our French-Canadian breed of cattle (the best dairy breed for farmers of this part of Canada), with Shorthorn blood (a beef breed) and of our breed of horses, also the best for this country, with heavy draft blood, such as the Clydesdale, the Percheron, etc., etc. Those gentlemen were assuredly sincere in their campaign of so-called improvement. It was in reality a campaign of destruction of our native breeds of horses and cattle, but the harm was done all the same.

To begin with, our Canadian mares were too small to be bred successfully to those 1800 and 1900 pounds, sometimes one-ton stallions, supposing they were of the good kind, and the offsprings could be nothing but scrubs with coarse heads, lanky bodies attached to heavy fore and aft quarters and supported upon long legs, too small for the weight they had to carry, consequently predisposed to ringbones, bonespavins, etc., etc. Just imagine what were the results with the stallions of inferior quality which were imported into this country at that time. But nobody seemed to care a row of pins about the French-Canadian horse, the destiny of which was to disappear from the land. Everybody seemed to look with scorn at that small horse and be hypnotized by the sight of a big one, the bigger the better, be it a Shire, a Clydesdale, a Suffolk Punch or a Percheron.

Things went on that way till 1880, when a few people made up their minds to do their utmost to save from complete destruction what was left of the French-Canadian horse and cow. In 1886 Record Books were opened for the two breeds respectively. The French-Canadian cow has been rehabilitated in the eyes of unprejudiced people and recognized as the best paying dairy cow for the common farmer.

Until 1896 circumstances were rather unfavorable respecting the conservation and improvement of the French-Canadian horse. At that time the writer organized the French-Canadian Horse Breeders' Association, and it was decided that the Province of Quebec be visited, by the inspectors of the association, in view of making a first selection for the records of those horses that came nearest to the old type of French-Canadian horse. Up to 1905, in round figures, 2000 were so selected and recorded.

Two years ago the records were nationalized and transferred to the Department of Agriculture of the Dominion. Hon. M. Fisher, the present Minister of Agriculture, had from the outset watched with interest and approved, on the whole, the work of the French-Canadian Horse Breeders' Association. Last year the Minister advised the Association to have a further selection made from amongst the recorded as well as the non-recorded horses of the country. At the same time he offered the co-operation of his department and promised a grant sufficient to carry on the work. The Minister's suggestion was accepted and a Commission, comprising two representatives of the Department of Agriculture of Canada, two from the French-Canadian Horse Breeders' Association and one veterinary surgeon, was appointed to visit every county of the Province of Quebec and select, so as to be recorded in the National Records, all horses presenting the main characteristics, of the old breed. The Commission has already examined in the neighborhood of 2000 horses which were considered by their owners and the *amateurs* as being worthy of registration. Of course, a large percentage of that number has not been accepted, but the animals which were accepted are very good specimens of the breed. The type of horses so selected by the Commission will be uniform. Height of stallions not to exceed 15.3; mares, not to exceed 15.2. Weight: stallions, not to exceed 1350 pounds with due allowance for fat; mares, not to exceed 1150 pounds. They must be compactly built, have strong legs and good feet, be perfectly sound, alert, and show no signs of any draught horse's blood.

To sum up the French-Canadian horse, such as will be registered in the National Records, will present as main characteristics:

Compactness, indicating strength and thriftiness.

Swiftness, without nervousness, indicating eagerness to work, aptitude for and endurance at roadster's work.

Soundness of limbs and wind.

The French-Canadian horse has just enough weight for any kind of work, is just active enough to travel well, and will stand either kind of work for a long time.

The success of the undertaking is assured, provided the owners of recorded mares coöperate with the Department of Agriculture of the Dominion of Canada and with the French-Canadian Horse Breeders' Association and keep those mares away—far away—from heavy draught stallions, but breed them only to those recorded in the National French-Canadian Horse Record, the certificates of registration of which bear the stamp of the Department of Agriculture of the Dominion.

So far only some twenty counties of the Province of Quebec have been visited by the Commission; there remain some fifty more to visit. It is expected that, when the inspection is finished, there will have been recorded about 2500 mares and 50 stallions.

In order to facilitate, and hasten if possible, the success of the undertaking, the F. C. Horse Breeders' Association intends to secure, either by purchase or otherwise, between 100 and 200 of the best mares and the best five or six stallions, taking special care that the animals be as exactly alike in shape, stamp, etc., etc., as possible. In order to fix forever the characteristics of the breed those mares, as well as their daughters, and in some cases their granddaughters, will be bred to those same stallions.

We are well aware of the dangers of in-and-in breeding, but we believe that it is possible, if not easy, to accomplish with this breed that which has been done so successfully, by that means, for other breeds.

SURGICAL CLINIC.

The clinic was held at the Kansas City Veterinary College, Friday, September 13, 1907, and a brief synopsis of the events is as follows:

CASE 1.—Contraction of perforans and perforatus in metacarpal region. Bay horse, aged, 16 hands high, weight 1,200 lbs. Tenotomy, by Dr. J. S. Anderson, Seward, Neb.

CASE 2.—Quittor involving the distal interphalangeal articulation of a hind foot. Roan gelding, aged, weight 1,200 lbs. Lateral cartilage removed and permanent dressing applied, by Dr. W. L. Williams, Ithaca, N. Y.

CASE 3.—Cryptorchid, neither testicle descended and no trace found in either inguinal region. Bay horse, 15 hands high, weight 1,000 lbs. Castration, by Dr. J. W. Klotz, Mt. Vernon, Ind.

CASE 4.—New growth on the penis. Phallotomy—amputation above the preputial ring, artificial urinary meatus made below ischial arch, general anæsthesia, by Drs. V. Schaeffer, Tekamah, Neb., and H. Jensen, Weeping Water, Neb.

CASE 5.—Dental cyst—large new growth in anterior nares originating from first and second pre-molars. Bay gelding, 7 years old, 15¾ hands high, weight 1,150 lbs. Cyst removed and first and second pre-molars extracted, by Dr. L. A. Merillat, Chicago, Ill.

CASE 6.—Purpura hemorrhagica. Intravenous injection by Dr. L. C. Tiffany, Springfield, Ill.

CASE 7.—Lameness, a slight exotosis on the distal end of the left anterior os corona. Bay mare, 6 years old, 16½ hands high. Median neurectomy, by Dr. J. H. Blattenberg, Lima, Ohio.

CASE 8.—Knee sprung. Total inability to extend to supporting position. Flexor metacarpi externus and internus divided above point where these tendons blend, by Dr. L. A. Merillat, Chicago, Ill.

CASE 9.—Roaring. Bay gelding, 15½ hands high, weight 1,050 lbs. Excision of the vocal cords and ventricles of the larynx, by Dr. W. L. Williams, Ithaca, N. Y.

CASE 10.—Yearling heifers. Oöphorectomy, by Drs. P. H.

Browning, San Jose, Cal.; Geo. R. White, Nashville, Tenn.; C. O. Netherton, Gallatin, Mo.

Case 11.—Calf, two weeks old. Bovovaccination, by Drs. H. McConnell and W. C. McPherson, New York, N. Y.

Case 12.—Abscess in fatty cushion of the foot from nail puncture through the frog; swelling in concavity above heel. Bay gelding, aged, 16 hands high, weight 1,300 lbs. Horn and part of fatty cushion removed, pus liberated and seaton passed beneath the perforans tendon and dressed antiseptically, by Dr. L. A. Merillat, Chicago, Ill.

Case 13.—Long ears, bitch. Cropping, by Dr. C. E. Steele, St. Joseph, Mo.

Case 14.—Abscess and new growth in frontal and nasal sinuses. Discharges from nostrils, bones over sinuses bulging. Bay gelding, 16½ hands high, weight 1,300 lbs. Trephined and cavities cleansed, by Dr. J. S. Anderson, Seward, Neb.

Case 15.—Canker of left front foot. Part of the sole destroyed and purulent discharge from denuded surface. Chestnut stallion, 16 hands high, weight 1,400 lbs. All diseased tissue removed, dressed with bichloride of mercury and instructions given to re-dress three days later with tar bandage, by Dr. P. Simonson, Fremont, Neb.

Case 16.—Bog spavin—hock recently injured in runaway—synovitis. Saphena major ligated, by Dr. P. Simonson, Fremont, Neb.

Case 17.—Springhalt. Discussion of cause, thought to be due in most cases to adhesion of spermatic cord in case of geldings. Operation, dividing cord above point of adhesion, by Dr. T. Bent Cotton, of Columbus, Ohio.

PATHOLOGICAL EXHIBIT AND DESCRIPTION.

DR. L. R. BAKER,
Inspector-in-Charge, et al.

1. *Generalized tuberculosis in hog*—showing very extensive lesions in the lungs, liver, spleen, and their lymphatic ganglions. Also well-marked lesions on the serous membranes (pearl disease), both visceral and parietal pleura, peritoneum, and omentum.
2. *Generalized tuberculosis in hog*—showing very extensive lesions in the cervical region, both glandular and muscular. Also well-marked lesions in the lungs, liver, spleen, pleura, visceral and body lymphatic glands.
3. *Generalized tuberculosis in hog*—showing very extensive lesions of all the visceral lymphatic glands, nearly all the body lymphatic glands, lungs, liver, spleen, pleura, kidneys, pancreas, and bones.
4. *Tuberculosis*—hog condemned on final post-mortem inspection, showing calcified lesions of the cervical, bronchial, hepatic, and superficial inguinal lymphatic glands.
5. *Tuberculosis—hind quarter of hog*—showing lesions in the hock joint and sublumbar lymphatic glands. Also tuberculous spleen from same hog.
6. *Tuberculosis—fore quarter of hog*—showing lesions in the elbow-joint.
7. *Tuberculosis—loin and rib, hog*—showing lesions on the pleura, in the bones, and sublumbar lymphatic glands.
8. *Tuberculosis—loin, hog*—showing lesions in the sublumbar lymph-glands, with tuberculous liver and spleen from same hog.
9. *Tuberculosis—lungs and liver of hog*—showing extensive caseous encapsulated lesions in the lungs, with caseo-calcareous lesions in the bronchial and mediastinal lymph-glands; also lesions in liver and hepatic lymph-glands.
10. *Tuberculosis—lungs, liver, and spleen, hog*—showing miliary tubercles in lungs and liver, with well-marked tubercles in spleen.

11. *Tuberculosis*—liver with stomach attached, spleen and kidneys from same hog, showing well-marked lesions of tuberculosis.

12*a*. *Hog heads*—showing a series of tuberculous lesions.

12*b*. *Hog heads*—showing the congested lymph-glands from a case of hog cholera.

12*c*. *Hog heads*—showing abscess formation in submaxillary lymph-glands.

13. *Hog cholera*—showing extensive and progressive lesions on the skin, bones, glands, a bloody urine, inspissated bile, with a hepatization of the lungs,—possibly a mixed infection with swine plague.

14. *Swine plague*—showing diffuse skin lesions, large, soft, and black spleen, congestion of the kidneys, with an acute hepatization of the lungs, and a slight pleurisy.

15. *Hog cholera*—very extensive and progressive circumscribed lesions on the skin, petechia in kidneys, leaf lard, lesions of spleen and liver, petechia in heart muscle, ulceration and acute inflammation in large intestines.

16. *Swine plague*—diffuse skin lesions, well-marked icterus, large, soft, and black spleen, congestion of the liver and kidneys, with acute red hepatization of the lungs.

17. *Pyemia*—showing very extensive abscesses on the carcass, with multiple metastatic abscess in the lungs, liver, and intestines.

18. *Pyemia*—showing abscess formation in the bones, lungs, liver, spleen, and small intestines.

18*a*. *Hog*—showing hepatogenous icterus.

19. *Hog*—condemned for chronic peritonitis and pleurisy, with both visceral and parietal lesions.

20. *Hog*—showing multiple adipose tissue necrosis, with extensive and well-marked lesions in carcass and viscera.

21. *Two shoulders*—showing specimens of the *Cysticercus cellulosæ* (pork measle bladder-worm), the larval stage of the hooked tapeworm of man,—*Tænia solium.*

22. *Hog livers*—showing hydatid or echinococcus disease in the hog, the larval stage of the tapeworm of the dog,—*Tænia echinococcus.*

23. *Loin of a hog*—showing location and lesions produced by the *Stephanurus dentatus.*

24. *Liver from hog*—showing chronic interstitial hepatitis, with scar-tissue formation, due to parasitic irritation.
24*a*. *Loop of intestine*—showing the nodules produced by the parasite *Echinorrhynchus gigas;* lesions are yellowish in color and may be mistaken for tuberculous patches.
24*b*. *Loop of intestine inverted*—showing parasite and its attachment to the mucous membrane with its armed proboscis, causing irritation and nodular formation.
25. *A series of skin diseases of the hog:*
25*a*. Integument—showing acute erythematous conditions.
25*b*. Integument—showing dark spotted pigmentations.
25*c*. Integument—showing dark diffuse pigmentation.
25*d*. Integument—showing acute erythema, due to traumatisms.
25*e*. Integument—showing papillomata.
25*f*. Integument—showing follicular mange, produced by the *Demodex folliculorum.*
25*g*. Integument—showing acute circumscribed hemorrhagic spots, from a case of hog cholera.
25*h*. Integument—showing normal conditions.
26. *A series of lung lesions of the hog:*
26*a*. Lungs—showing tuberculosis.
26*b*. Lungs—showing abscess formation with chronic pneumonia.
26*c*. Lungs—showing a well-marked congestion.
26*d*. Lungs—showing acute hepatization.
26*e*. Lungs—showing gray hepatization with approaching resolution.
26*f*. *Lungs*—showing catarrhal pneumonia.
26*g*. Lungs—showing normal conditions.
26*h*. Lungs and heart—showing chronic pericarditis.
27. *A series of pleural lesions of the hog:*
27*a*. Pleura—showing tuberculosis
27*b*. Pleura—showing acute pleurisy.
27*c*. Pleura—showing chronic pleurisy with well-marked exudation.
27*d*. Pleura—showing parietal and visceral adhesions.
27*e*. Pleura—showing normal conditions.
28. *A series of peritoneal lesions of the hog:*
28*a*. Peritoneum—showing chronic peritonitis.
28*b*. Peritoneum—showing acute peritonitis.

28*c*. Peritoneum—showing multiple abscesses.
28*d*. Peritoneum—showing adhesions.
28*e*. Peritoneum—showing normal conditions.
29. *A series of liver lesions of the hog:*
29*a*. Hog liver—showing chronic interstitial hepatitis.
29*b*. Hog liver—showing multiple abscesses.
29*c*. Hog liver—showing yellow pigmentations.
29*d*. Hog liver—showing fatty degeneration.
29*e*. Hog liver—showing tuberculosis.
29*f*. Hog liver—showing hydatid disease.
29*g*. Hog liver—showing normal conditions.
30. *A series of spleen lesions of the hog:*
30*a*. Hog spleen—showing tuberculosis.
30*b*. Hog spleen—showing multiple abscesses.
30*c*. Hog spleen—showing the large, soft, and black condition from a case of swine plague.
30*d*. Hog spleen—showing atrophy.
30*e*. Hog spleen—showing normal conditions.
31. *A series of kidney lesions of the hog:*
31*a*. Hog kidneys—showing tuberculosis.
31*b*. Hog kidneys—showing fatty degeneration.
31*c*. Hog kidneys—showing yellow pigmentation from a case of icterus.
31*d*. Hog kidneys—showing petechia.
31*e*. Hog kidneys—showing hyperæmia.
31*f*. Hog kidneys—showing cystic conditions.
31*g*. Hog kidneys—showing the location of the *Strephanurus dentatus* in its capsule.
31*h*. Hog kidneys—showing normal conditions.
32. *Diseases of pancreas, hog:*
32*a*. Pancreas from hog—showing necrosis of the adipose tissue.
32*b*. Pancreas of hog—showing tuberculosis.
32*c*. Pancreas from hog—showing normal conditions.
33. *Intestinal diseases of hog:*
33*a*. Large intestines from hog—showing acute inflammation.
33*b*. Small intestines from hog—showing tuberculosis in the mesenteric lymph-glands, also the presence of the *Echinorrhyncus gigas* in the intestinal loop.
33*c*. Small intestines from hog—showing mesenteric emphysema.

33*d*. Loop of small intestine—showing the presence of intestinal worms.

33*e*. A portion of small intestines—with mesentery showing normal condition.

33*f*. Stomach of hog—showing acute gastritis.

33*g*. Stomach from hog—showing normal condition.

34. Leaf lard and omentum—showing adipose-tissue necrosis (fat necrosis).

MISCELLANEOUS.

35. *Hind quarter of hog*—showing melanosis; lesions in mammary glands, with tumor on belly.

36. *Three specimens showing diaphragmatic hernia in hog:*

36*a*. One lobe of liver and part of omentum in the thoracic cavity.

36*b*. One lobe of liver in thoracic cavity.

36*c*. Omentum in thoracic cavity.

37. *Liver of hog*—showing concretions in parenchymatous tissues, and in the bile-ducts.

38. *Small intestines of hog*—showing faulty development or arrested development of the mesentery.

39. *Extra-uterine pregnancy, sow*—showing a fœtus which was developed in the abdominal cavity, enclosed in the omentum.

40. *Head of a calf*—a well-marked case of hydrocephalus.

41. *Ægagropila*—a collection of hair balls found in the rumen and reticulum of cattle.

42. *Large abscess*—from region of neck of a cow; lesions show well-defined walls, with a peculiar organized condition of its contents.

43. *Diaphragmatic hernia in steer*—showing a portion of the liver and peritoneum in the thoracic cavity with adhesion of lungs.

44. *Ovaries from a cow*—showing multiple cysts.

45. *Ovaries from a sow*—showing multiple cysts.

46. *Supernumerary digits* in the hog.

47. *Specimen from a hog*—showing dilatations of the rectum, imperforation of the anus, and the rectum communicating with the vagina.

48. *A portion of the reticulum from a cow*—showing the presence of foreign bodies. One nail has become caught in

the folds of the mucous lining and another has perforated its walls, causing a chronic irritation with abscess formation.

49, 50. *Two hind quarters*—showing extensive necrosis and atrophy of muscular tissues, from a hog that was paralyzed behind.

51. *Specimen from a hog*—showing extensive bruises of muscular tissues in region of the flank.

52. *Abscess, steer*—sublumbar region on right side, with liver adhesions; lesions show well-encapsulated walls of the abscess.

53. *Abscess formation*—in mammary glands of the hog.

54. *Abscess formation*—from scrotal region of the hog.

55. *Mammary gland of cow*—showing lesions of tuberculosis.

56. *Two kidneys from a hog*—pathological alterations,—lymphosarcoma.

57. *Two kidneys from same hog*—the right kidney an adenosarcoma, weighing 13 pounds. The left kidney normal in size, weighing 3½ ounces.

58. *Bovine spleen*—showing a large hematoma, weighing 12½ pounds.

59. *Bovine carcass*—showing 22 sarcomatous neoformations of the mixed-cell variety.

60. *Large fibroma*—weight 20 pounds; taken from the flank of a cow.

61. *Lympho-sarcoma*—taken from the sublumbar region of a steer.

62. *Cystic kidney*—weight 20 pounds; taken from a hog.

63. *Generalized tuberculosis*—a cow tagged with U. S. suspect tag on ante-mortem inspection, showing a well-marked enlargement of the cervical region. On post-mortem inspection the carcass showed extensive lesions in submaxillary and retropharyngeal lymphatic glands, a large abscess posterior to pharynx, extensive and progressive tuberculous lesions in the lungs, on the pericardium and pleura, in the bronchial and mediastinal lymph-glands, liver, and mesenteric lymph-glands, and on the peritoneum. Carcass emaciated and anemic.

64. *Pleural and peritoneal region of cow*—showing very extensive tubercular lesions on pleura, also in the lungs and lymphatic glands of the thorax.

65. *Pleural and peritoneal region of steer*—showing slight lesions of tuberculosis on the pleura and peritoneum. An infection of the shoulder muscles with integument from the same region. Lesions in the prescapular lymph-glands. Also extensive lesions in lungs, bronchial and mediastinal lymph-glands, liver, and mesenteric lymph-glands.
66. *Liver from a generalized case of tuberculosis in a bull*—showing very extensive caseous lesions, with general hypertrophy of the organ, which weighed 63 pounds.
67. *Liver from a healthy bull*—weighing 12 pounds.
68. *Bovine shoulder from a generalized case of tuberculosis*—showing very extensive caseous lesions of the prescapular lymph-glands.
69. *Bovine heads*—showing a series of tubercular lesions, both caseous and calcified.
70. *Bovine lungs*—showing acute and progressive lesions of tuberculosis.
71. *Lungs from a Texas steer*—showing very slight calcified tubercular lesions in the bronchial and mediastinal lymph-glands, with slight foci of infection in the right lung.
72. *Pleura and peritoneal region from a young fat cow*—showing very extensive tubercular lesions (pearl disease).
73. *Peritoneal region, with lungs, from a large native steer*—showing acute tubercular lesions in the lungs and their lymph-glands, with acute peritonitis.
74. *Bovine uterus, from a generalized case of tuberculosis*—showing an infection of the ovaries and organ.
75. *Bovine mammary glands, from a case of generalized tuberculosis*—showing well-marked lesions of tuberculosis in the organ and its corresponding lymphatic glands.
76. *Bovine small intestines*—showing tuberculosis in chain of mesentery lymph-glands.
77. *A series of lesions in bovine lungs*

77a. Bovine lungs—showing tuberculosis.
77b. Bovine lungs—showing actiomycosis.
77c. Bovine lungs—showing chronic pneumonia.
77d. Bovine lungs—showing a localized abscess.
77e. Bovine lungs—showing melanosis.
77f. Bovine lungs—showing adhesions to diaphragm.
77g. Bovine lungs—with heart, showing pericarditis with adhesions.

78. *A series of lesions in bovine livers:*
78*a*. Bovine liver—showing spotted capillary angiomatosis.
78*b*. Bovine liver—showing atrophic cirrhosis.
78*c*. Bovine liver—showing hypertrophic cirrhosis.
78*d*. Bovine liver—showing a biliary calculus in gall-bladder.
78*e*. Bovine liver—showing parenchymatous hepatitis.
78*f*. Bovine liver—showing well-marked peritoneal adhesions.
78*g*. Bovine liver—showing multiple abscesses.
78*h*. Bovine liver—showing an accessory lobe.
78*i*. Bovine liver—showing yellow pigmentation, from a case of hepatiogenous icterus.
78*j*. Bovine liver—showing coccidiosis.
78*k*. Bovine liver—showing tuberculosis.
78*l*. Bovine liver—showing infestation of the *Distoma hepaticum*. Liver somewhat hypertrophied, the biliary canals very much enlarged, with calcification of their walls.
78*m*. Bovine liver—showing the location of the flukes in the parenchymatous tissues, also the lacunar chambered spaces full of a clammy, bloody, brownish, viscous liquid, in which the flukes are found.
79. *A series of bovine heads showing different lesions of actinomycosis.*
80. *Bovine tongues affected with actinomycosis,* the pathological alteration known as a "wooden tongue."
81. *Two bovine heads*—showing foreign objects imbedded between the teeth and muscles.
82. *Bovine œsophagus*—showing the thread-worm, *Filaria scutata.*
83. *Bovine œsophagus*—showing the larvæ of the *œstrus bovis.*
84. *Bovine small intestines*—showing submucous nematode tubercles, the larvæ of the *Anchylostomum bovis.* These nematode tubercles are very common and very frequently found in bovine intestines.
85. *Bovine small intestines*—showing ossification of the mesentery.
86. *Calf kidney*—pathological alteration, sarcomata.
87. *Bovine caul*—showing fatty necrosis.
88. *Bovine pleural region*—showing acute circumscribed pleuisy of traumatic origin.
89. *Bovine pleural region*—showing chronic pleurisy with well-marked exudations.

90. *Bovine pleural region*—showing lesions of tuberculosis.
91. *Bovine peritoneal region*—showing acute circumscribed peritonitis with fracture of ribs, traumatic.
92. *Bovine peritoneal region*—showing chronic peritonitis with well-marked exudations.
93. *Bovine peritoneal region*—showing multiple abscesses.
94. *Bovine peritoneal region*—showing lesions of tuberculosis.
95. *A portion of a bovine carcass*—showing very extensive bruises.
96. *Bovine shoulder region*—showing bruises with gangrenous condition.
97. *An acute case of Texas fever in a calf*—showing the intense icteric condition of the carcass, the large, soft, black, and friable spleen, bloody urine, yellowish hue of the liver and the viscid inspissated bile in the gall-bladder.
98. *Integument from scrotal region of a southern steer*—showing the cattle tick, *Boöphilus annulatus*, the carrier of Texas fever.
99. *Spleen of an acute case of Texas fever* in a calf.
100. *Spleen from a healthy calf.*
101. *Bovine spleen of an acute case of Texas fever.*
102. *Spleen from a healthy steer.*

PARASITES DISPLAYED.

103. *Distoma hepaticum*—the common liver fluke.
104. *Distoma magnum*—the large American fluke.
105. *Filaria cervina*—found in the abdominal cavity of domestic cattle.
106. *Stephanurus dentatum*—a common parasite in swine.
107. *Ascaris lumbricoides suilla*—common intestinal worm of the hog.
108. *Echinorrhynchus gigas*—intestinal worm of the hog, armed, but not segmented.
109. *Tænia expansa*—common tapeworm of cattle.
110. *Strongylus contortus*—found in the abomasum of sheep and goats, producing anemia and progressive emaciation in the animals which it infests.
111. *Lungs of sheep*—showing caseous lymphadenitis.
112. *Liver of sheep*—showing large caseous abscesses.

113. *Abomasum of sheep*—showing the location of the *Strongylus contortus.*
114. *Lamb*—showing emaciation and anemia, caused by infestation of the *Strongylus contortus.*
115. *Intestines of sheep*—showing nodular disease, lesions produced by *Œsophagostoma columbianum.*
116. *Sheep*—showing extreme emaciation.
117. *Sheep*—showing icterus and hernia.

SOCIAL FEATURES.

The local committee of arrangements, headed by Dr. Stewart as chairman, arranged a very pleasant program for entertainment. It would seem hardly fair to give the members of the committee the whole credit. It must be understood that the Kansas City ladies had much to do with this feature of the work.

The social features of the Kansas City meeting were fully as well arranged as in former years. Among the lady visitors were observed many new faces, while very few of the old standbys were present.

The first in order, after greetings, was a tally-ho ride through the principal parts of the town, and this city has some of the finest boulevards and picturesque drives in America. The ride lasted most of the afternoon and was thoroughly enjoyed by all that participated.

In the evening a reception was held in the meeting hall. The ladies shared in these pleasures. There were dancing and visiting, and a thoroughly enjoyable evening was spent by all who attended. There was much surprise expressed at the elegance with which Dr. Stewart stepped off the round dances. Mrs. Hoskins was equally as graceful in the old-fashioned square dance, while Dr. Noack prefered to entertain his lady friend and view the proceedings from the balcony. It was the general opinion that, as a manager of square dances and social affairs in general, Dr. Ed. Leech might have gained a national reputation.

We are sure the ladies must have enjoyed the second day, which started with a trip through the shopping district. The list of purchases ranged from souvenir postal cards to diamond stick-pins. Many beautiful trophies were purchased for the loved ones at home, and all realized how much more blessed it is to give than to receive. At noon a group picture was taken in front of the Coates House.

The ladies spent the afternoon in a trolley ride which covered portions of the town that had not been touched the day before.

In the evening the meat and milk questions were thoroughly discussed after hearing the able papers presented on these subjects by Drs. Reynolds and Cary.

Thursday forenoon the members and visitors spent the time very profitably in inspecting the Armour Packing Plant. This is one of the largest and best-equipped plants in this country. A large collection of pathological specimens had been arranged for the occasion, and the men employed as inspectors by the Bureau of Animal Industry pointed out the many interesting lesions. The bureau men also acted as guides. The company served a very bountiful luncheon after the tour of inspection was finished. The party left the Armour Packing Plant with a much higher opinion of canned goods and prepared meats than was formerly held. There was general satisfaction expressed with the cleanly manner in which all parts of the work of preparing meats for food was conducted.

The ladies attended a vaudeville show in the afternoon as the guests of the entertainment committee.

Thursday evening the regular annual banquet was held in the large dining-hall of the Coates House. Nearly every visitor and member attended this pleasant social function. After the banquet was finished, speeches were made by many of our eloquent members. The retiring president, Dr. Law, and President Dalrymple were among the first to be heard. Drs. Quitman, Merillat, Hoskins, Brenton, Archibald, and several others spoke. The persons who miss this annual banquet are deprived of one of the richest blessings of our association.

Friday morning the ladies were taken for another tally-ho ride. On this trip a stop was made at the tallest building in the city and all were taken to the top, where a bird's-eye view of the city and surrounding country could be had. The tally-ho ride terminated at the Kansas City veterinary college, where a dinner was served by the faculty.

In the evening the members and visitors attended a theatre party given by Parke, Davies & Co. The entertainment was a good one, and the party was once more under a great debt of gratitude to this company for the thoughtful manner in which it has, from year to year arranged valuable treats of various kinds.

Many pleasant trips were arranged for the homeward journey. Some went to Denver and the far West, others prefered to go by Chicago or the extreme southern route, while a number visited the Jamestown Exposition as a side issue. The Kansas City meeting was considered one of the most pleasant affairs in the history of our organization.

THE ASSOCIATION OF VETERINARY FACULTIES AND EXAMINING BOARDS OF NORTH AMERICA.

KANSAS CITY, MO.,
Sept. 9, 1907.

The meeting was called to order at 4.10 P.M. by the President, Dr. W. Horace Hoskins.

The proceedings, as printed in the Annual Report of the American Veterinary Medical Association for 1906, were adopted as the minutes of the last annual meeting of this Association, and the reading of the same was dispensed with at this time.

The roll call showed the following present:

Representing State Boards:

David F. Fox, 1415 J St., Sacramento, Cal.
R. A. Archibald, 1724 Webster St., Oakland, Cal.
F. W. Culver, Longmont, Colo.
Chas. G. Lamb, Denver, Colo.
Thos. Bland, Waterbury, Conn.
R. P. Lyman, Hartford, Conn.
J. R. Mohler, Washington, D. C.
John Scott, Peoria, Ill.
J. J. Herron, Tipton, Ind.
G. G. Ferling, Richmond, Ind.
O. L. Boor, Muncie, Ind.
P. Malcolm, New Hampton, Iowa.
P. W. Hadley, Kansas City, Kan.
G. A. Jarman, Baltimore, Md.
M. H. Reynolds, St. Anthony Park, St. Paul, Minn.
D. F. Luckey, Columbia, Mo.
Horace Bradley, Windsor, Mo.
A. T. Peters, Lincoln, Neb.
J. S. Anderson, Seward, Neb.
Wm. Herbert Lowe, 277 Ellison St., Paterson, N. J.
Wm. Henry Kelly, Albany, N. Y.
Tait Butler, Raleigh, N. C.
D. S. White, Columbus, Ohio.
Louis P. Cook, Cincinnati, Ohio.
W. Horace Hoskins, Philadelphia, Pa.
Geo. R. White, Nashville, Tenn.

Representing Veterinary Faculties:

Chicago Veterinary College:

Joseph Hughes, Chicago, Ill.
L. A. Merillat, Chicago, Ill.

Cincinnati Veterinary College:
  Louis P. Cook, Cincinnati, Ohio.
Grand Rapids Veterinary College:
  M. C. Wright, Grand Rapids, Mich.
  A. C. Branson, Grand Rapids, Mich.
Indiana Veterinary College:
  G. H. Roberts, Indianapolis, Ind.
  Jos. W. Klotz, Noblesville, Ind.
Kansas City Veterinary College:
  S. Stewart, Kansas City Mo.
  R. C. Moore, Kansas City, Mo.
  B. F. Kaup, Kansas City, Mo.
  A. T. Kinsley, Kansas City, Mo.
  Ll. Champlain, Kansas City, Mo.
  F. F. Brown, Kansas City, Mo.
New York-American Veterinary College:
  Roscoe R. Bell, Brooklyn, N. Y.
  J. L. Robertson, New York City.
St. Joseph Veterinary College:
  C. E. Steel, St. Joseph, Mo.
United States College of Veterinary Surgery:
  John R. Mohler, Washington, D. C.
    (Representing Dr. C. Barnwell Robinson.)
Western Veterinary College:
  Julius H. Wattles, Kansas City, Mo.
Veterinary Department, Alabama Polytechnic Institute:
  C. A. Cary, Auburn, Ala.
Veterinary Department, Colorado State Agricultural College:
  Chas. G. Lamb, Denver, Colo.
  I. E. Newsom, Fort Collins, Colo.
New York State Veterinary College:
  Jas. Law, Ithaca, N. Y.
  W. L. Williams, Ithaca, N. Y.
  V. A. Moore, Ithaca, N. Y.
Veterinary Department, Iowa State Agricultural College:
  J. H. McNeil, Ames, Iowa.
Veterinary Department, Kansas State Agricultural College:
  Burton Rogers, Manhattan, Kan.
Veterinary Department, Ohio State University:
  David S. White, Columbus, O.
Veterinary Department, University of Pennsylvania:
  C. J. Marshall, Philadelphia, Pa.
Representing American Veterinary Medical Association:
  Chas. E. Cotton, Minneapolis, Minn.
  Geo. H. Berns, Brooklyn, N. Y.
Other Veterinarians in attendance:
  W. H. Dalrymple, Baton Rouge, La.
  W. Lenton, Fayetteville, Ark.
  F. H. Schneider, Philadelphia, Pa.

Stanley Smith, Columbia, Mo.
C. A. Clark, College Corner, O.
Chas. R. Simpson, Somerville, Mass.
Chas. A. McKim, Lincoln, Neb.
Otto G. Noack, Reading, Pa.
J. W. Connaway, Columbia, Mo.
E. M. Bates, Coffeyville, Kan.
Geo. H. Baxter, Alma, Neb.
J. E. Kline, Lamar, Mo.
W. N. Armstrong, Concord, Mich.
C. B. McClelland, Lawrence, Kan.
V. Schaefer, Tekamah, Neb.
W. R. O'Neal, Wayne, Neb.
Geo. W. Dunphy, Quincy, Mich.
S. Brenton, Detroit, Mich.
T. C. McCasey, Concordia, Kan.
E. J. Netherton, St. Joseph, Mo.
A. D. Melvin, Washington, D. C.

Secretary-Treasurer made Report and read statement of receipts and disbursements.

The instructions to the Secretary given at the last meeting, to the effect that he correspond with the various veterinary colleges and urge them to furnish this Association all the facts and conditions on which all students were matriculated, was complied with, and this correspondence indicated a general disposition to comply with the request, but with certain colleges there were reservations and conditions upon which compliance with the request of the Association would be made.

Financial Statement.

Receipts: One dollar from each of 32 veterinarians	$32.00
Disbursements:	
Postage and expressage, 1906	2.47
Printing, stationery, programmes, etc., 1907	20.25
Postage, 1907	5.56
Expenses—President Hoskins	3.00
	$31.28
Balance, cash on hand	.72
	$32.00

President Hoskins called for report of standing committee. Dr. John W. Adams, Chairman, being absent, no report was forthcoming. Reports were then called for from the sub-committees of the standing conference committee.

State Schools—No report.

Private Schools—A verbal report was made by Drs. Stewart and Merillat.

State Boards—No report.

American Veterinary Medical Association—No member of sub-committee present at time called, hence no report.

Regular Programme.

"A Plea for the Better Observance of Intercollegiate Relations," Dr. Geo. H. Roberts, Indianapolis, Ind. (See papers.)

President Hoskins appointed as a committee to consider and report on the recommendations contained in Dr. Roberts' paper: Drs. S. Stewart, J. H. McNeil, Wm. Henry Kelly, and Geo. H. Berns.

"The Preparatory Education of the Veterinary Student," Dr. W. L. Williams, Ithaca, N. Y. (See papers.)

The President appointed Drs. D. S. White, Geo. R. White, L. A. Merillat, and Chas. E. Cotton, a committee to consider and report on the suggestions in Dr. Williams' paper.

Meeting adjourned to meet at 8 P.M.

Monday, Sept. 9, 8 P.M.

The meeting was called to order by President Hoskins.

Dr. M. H. Reynolds discussed at considerable length the second subject set down in the printed programme for discussion, "Uniformity in Examinations of State Boards and Interstate Reciprocity in Recognizing State Board Certificates." The discussion of this subject was lengthy and spirited and was engaged in by Drs. Hoskins, Kelly, D. S. White, Scott, Merillat, Lyman, Lowe, Williams, Boor, Bradley, Malcolm, and Law.

Dr. Thomas Bland, Waterbury, Conn., presented a review of the enactment and enforcement of veterinary practice laws in Connecticut. (See papers.)

The Committee on Dr. Williams' paper submitted preliminary report. The report was received and adopted and on motion the committee was instructed to prepare and report to the Association a feasible plan for carrying out the recommendations embodied in its report.

On motion it was ordered that these recommendations of the committee be communicated to the American Veterinary Medical Association. (Report not received.—ED.)

Dr. Geo. R. White, Nashville, Tennessee, opened the discussion of the subject "Is it Practical for State Examining Boards to Frame their Questions for License to Practice so that the Answers of Applicants thereto may indicate a General Educational Knowledge Equivalent to the College Entrance Examination which this Association determines should be maintained." (See papers.)

Dr. David S. White, Columbus, O., opened the discussion on the subject: "What Credit may Colleges allow Matriculants of Medical Colleges who have attended, First, One Year; Second, Two Years; Third, Three Years?" A general discussion followed on this subject, and also on the question, "Are Colleges justified in admitting Students to Advanced Classes who have not attended any College long enough to acquire a Recognized Credit, but who can pass an Examination Equivalent to the

Regular Examinations of the Colleges Leading to the said Advanced Standing, the Examination Papers in such Cases being subject to the Inspection of this Association?" and was engaged in by Drs. Stewart, Hughes, Williams, Roberts, Wright, Cook, McNeil, Rogers, G. R. White, Cary, Bradley, R. C. Moore, Mohler, and Butler.

The election of officers for the ensuing year was taken up and the following duly elected:

President: Dr. Jos. Hughes, Chicago, Ill.
1st Vice-President: Dr. S. Stewart, Kansas City, Mo.
2nd Vice-President: Dr. Wm. Herbert Lowe, Paterson, N. J.
Secretary-Treasurer: Dr. Tait Butler, Raleigh, N. C.

Adjourned to meet at 9 A.M. Tuesday, Sept. 10.

Meeting called to order at 9 A.M., Tuesday, Sept. 10, by the retiring President Dr. Hoskins, who, after thanking the Association for past courtesies, called the President-elect, Dr. Hughes, to the chair.

President-elect Hughes in taking the chair expressed his thanks for the honor conferred and stated that with the successful example of his predecessor as a guide he would endeavor to perform satisfactorily the duties of his office.

Dr. Louis P. Cook, Cincinnati, O., offered the following resolutions embodying suggestions for the control or guidance of veterinary colleges:

RESOLUTION OFFERED BY LOUIS P. COOK, CINCINNATI, OHIO.

I move that this Association establish and maintain a list of what shall be known as recognized and approved Veterinary Colleges of North America; the association requirements of colleges desiring to be listed thereon to be as follows:

SECTION 1. They must be legally organized and honorably conducted.

SECTION 2. They must have a teaching staff of not less than eight teachers, at least four of whom must be graduates of recognized and approved veterinary colleges who have had not less than five years experience in the teaching or practice of veterinary science, and not more than two of these four to be graduates of any one school.

SECTION 3. They must maintain a graded course of not less than three sessions in different calendar years, each session to contain not less than 125 days of teaching, averaging not less than five hours each.

SECTION 4. They must require an attendance of not less than 70 per cent. of every student in the exercises in each branch taught.

SECTION 5. They must teach by lectures or demonstrations the following branches of study:

Veterinary Anatomy	not less than	500 hours
Theory and Practice of Veterinary Medicine	" " "	500 "
Principles and Practice of Veterinary Surgery	" " "	150 "
Veterinary Obstetrics	" " "	50 "
Materia Medica and Therapeutics	" " "	150 "
Pathology	" " "	100 "
Physiology and Histology	" " "	100 "

Chemistry	"	"	"	100	"
Bacteriology	"	"	"	50	"
Medical Zoölogy	"	"	"	25	"

SECTION 6. They must give sufficient laboratory instruction in Histology, Pathology, Chemistry, Physiology and Bacteriology to qualify each student for practical laboratory work in each and every one of these branches.

SECTION 7. They must give each student sufficient practical clinical and hospital work to enable him to acquire proficiency in diagnosis and treatment of the common diseases of the different species of domestic animals.

SECTION 8. They must require every student to become proficient in performing the surgical operations commonly performed by veterianarians in practice.

SECTION 9. They may allow advanced standing only to those who bear proper credentials of attendance and examinations, issued by recognized and approved colleges, except that colleges maintaining courses of not less than three years of nine months each, may allow advanced standing of one year to those who have attended not less than two sessions at reputable schools of medicine, dentistry and agriculture.

SECTION 10. They must matriculate only men of good character, average intelligence, some adaptability, and of at least a full common school education.

SECTION 11. They must require each candidate for matriculation to make an application in writing in the presence of some officer of the college, and in duplicate form, said application to give the full name and address of the applicant, the date and place of his birth, his principal occupation, and a complete and comprehensve statement covering his general education. He must also be required to give on said application the names and addresses of those persons who have knowledge of his character and habits and to whom application may be made for reference.

SECTION 12. They must graduate only those who prove that they are at least fairly proficient in each and every branch required to be taught.

SECTION 13. They must send to the address of the Secretary of this Association by registered mail the duplicate applications made out by the applicants for matriculation within thirty days after the opening of each college session, together with a statement as to the action taken on the applications.

SECTION 14. They must hold a written examination of not less than ten questions at the end of each session in each and every branch taught, these papers to be kept by the college, subject to inspection at all times by representatives of this Association.

SECTION 15. They must make a report to this Association within ten days after the close of each annual session, supported by affidavit of some officer of the college, certifying that these rules were faithfully complied with during the session.

After discussion by Drs. Melvin, Hoskins, Roberts, Mohler, Butler, and Cook, it was moved and carried that these resolutions be referred to the Standing Committee with instructions to report the minimum standard of requirements to be enforced by colleges, on the general plan outlined in said resolutions of Dr. Cook.

The meeting adjourned to meet at the call of the President.

Thursday, Sept. 12, 1907.

Meeting called to order by President Hughes at 9 A.M.

The subject on the programme, "What Credit may Colleges allow First-Year and Second-Year Students of Agricultural Colleges which maintain Two Years' Veterinary Instruction Corresponding to the first Two Years in Veterinary Colleges," was discussed by Drs. McNeil, Law, Lamb, Stewart, and Butler.

On motion the President and Secretary were instructed to codify and send out the various recommendations of this Association to the Veterinary Colleges and notify said colleges that these recommendations are the minimum which will be demanded by this Association.

For the financial support of the Association for the ensuing year forty-one members contributed one dollar each = $41.00.

Standing Conference Committee.

Sub-Committee Representing State Schools:

Leonard Pearson, Veterinary Department University of Pennsylvania, Philadelphia, Pa., Chairman.

V. A. Moore, Veterinary Department Cornell University, Ithaca, N. Y.
J. H. McNeil, Veterinary Department Iowa Agricultural College, Ames, Iowa.

Sub-Committee Representing Private Schools:

S. Stewart, Kansas City Veterinary College, Kansas City, Mo., Chairman.
Geo. H. Roberts, Indiana Veterinary College, Indianapolis.
Roscoe R. Bell, New York-American Veterinary College, Brooklyn, N. Y.

Sub-Committee Repesenting State Examining Boards:

M. H. Reynolds, St. Anthony Park, St. Paul, Minn., Chairman.
Thos. Bland, Waterbury, Conn.
R. A. Archibald, Oakland, Cal.

Sub-Committee Representing American Veterinary Medical Association:

G. W. Dunphy, Detroit, Mich.
G. H. Berns, Brooklyn, N. Y.
E. H. Shepard, Cleveland, O.

The above sub-committees constitute the Standing Conference Committee of the Association of which Dr. S. Stewart is Chairman.

Adjourned.

TAIT BUTLER, *Secretary.*

A PLEA FOR THE BETTER OBSERVANCE OF INTERCOLLEGIATE RELATIONS.

By GEO. H. ROBERTS,
Indianapolis, Ind.

A thorough consideration of all the phases of the subject which it will be my endeavor to present to you, would entail so much time that it can readily be understood that in a limited paper of this sort, the various subjects can only be dwelt upon in a most superficial manner. My object being solely to bring up for discussion before this Association of Veterinary College faculties and examining boards, various matters of intercollegiate relationship which, up to the present moment, have received too little attention, and as a result have led to unnecessary misunderstanding and perhaps at times positive ill feeling between some of the colleges. It needs but little knowledge of existing conditions to readily understand that American veterinary colleges have reached the parting of the ways. The future of the veterinary profession was never so bright as it appears to be today, and it depends solely upon us individually as teachers, and collectively as faculties, whether we will, by our conduct of college affairs, add lustre to the eminence at which we have arrived or whether, by a continuation of our slipshod and careless management, not so much of our individual colleges, but mainly of our intercollegiate affairs, let slip from us the advantages gained after so many years of toil. The time has passed when any veterinary college has a right to expect to remain a successful teaching institution independently of its relations with its sister schools. The time has come when petty jealousies and childish bickerings must be laid aside. The good of the individual must at times be subservient to the good of the many. "United we stand; divided we fall," is a saying which may be most wisely applied to the problems confronting us, and unless we absolutely make up our minds that "in union there is strength," the veterinary colleges of America will never reach the position which should rightfully be theirs, nor will they ever be able to give the systematized and instructive courses of study which the veterinary student has a right to expect of them.

The first subject which demands our consideration is that of college entrance requirements. What should be the requirements asked of an applicant for admission to a veterinary college? Should we allow him to enter upon his studies regardless of preliminary education? Should we demand of him a grammar school diploma, or go further and accept only those who present high school diplomas, or, draw the line still closer and admit only those who show college or university credentials? The admission of students, regardless of preliminary education, need not be dwelt upon, for I do not believe that there is any school a member of this Association, which does not require of an applicant not in possession of school credentials, to prove himself by examination to be master of at least an average grammar school education. The rock upon which our bark has so often split, however, is—shall we admit students who simply have a grammar school education, or insist upon high school or college credentials or an examination equivalent to work taught by such institutions before permitting them to enter our schools? The ultimate point for which all of us who have the best interests of the veterinary profession at heart are naturally striving, is to build up our schools and give such scientific courses, that none but high school or college graduates will find themselves preliminary equipped to undertake the work. While this is the ultimate object, those who have given this matter any practical investigation will agree with me that this high standard cannot be insisted upon at the present time and must be left for future consideration, and I have no doubt that such standard of entrance requirements will obtain much sooner than many of us expect. But for the present it is out of the question. It is not my object to include in this paper a consideration of any of the financial or business affairs of colleges, but when one stops to consider that out of probably twenty-two veterinary colleges in America, at the most ten are endowed by their respective States or from private sources, and that the remainder are private schools, absolutely unendowed, depending entirely for their maintenance upon fees collected from their students, then it is not difficult to understand that no matter how high our ideals may be, no matter how great our teaching enthusiasm, the majority of schools would be unable to weather the monetary deficits which would be sure to follow the falling off in attendance as a result of such high and stringent entrance requirements.

While the writer knows full well that the financial and teaching departments of any institution should be kept entirely independent of each other, the fact cannot be brushed aside that private institutions cannot very long exist without sufficient income from students to pay expenses, and although the writer would be glad to see the very highest entrance requirements, he is sorry to say that he feels that the stringent enforcement of such requirements would be the deathblow to twelve of the existing colleges. I believe that it is neither necessary nor desirable that there should be a uniform entrance requirement. The veterinary departments of state-supported universities should have the same entrance requirements as are established for all departments. They can and should make their requirements high, and thereby give the same prestige to the profession as given to other professional courses. The standard for entrance set by endowed schools may be too high for some of the private schools at present, but their example will not be without a wholesome influence. This Association can well recommend a minimum requirement of a good grammar school education, at this time, and hope in the near future that more may be demanded. It must not be forgotten that after an existence of over a hundred years, the medical colleges of America have only arrived within the last few years at the point when high school diplomas or equivalent examination is compulsory, and at this writing, out of a total of probably one hundred and seventy-five medical colleges in the United States, there are not more than two who demand an applicant to be a university graduate or pass an equivalent examination before being entered.

In our efforts to improve schools, we are apt to allow our enthusiasm to get the better of us, and in this wise, ask too much of prospective students. Let us not forget that it is just as unwise to be too exacting as on the other hand, to be too lenient.

Next in order comes the granting of advance standing to graduates in pharmacy, dentistry, human medicine, and of agricultural schools. The writer believes that pharmacists should receive credit for subjects taken up in their pharmacy course, as botany, pharmacology, materia medica, chemistry, etc. There is no valid reason why they should receive credit for subjects such as anatomy, osteology, physiology, histology, or pathology, a fundamental knowledge of which is all important, and of which they know no more than any other beginner. To dentists it seems right to give one full years' credit, as the subjects taught in freshman dentistry are in the main similar to those of the freshman year in veterinary work; but even they are not justly entitled to more than one year's credit, for after the first year, the work of the two courses is so different that the dental education ceases to be of sufficient advantage to the student to entitle him to special consideration.

The granting of advance standing to graduates of human medicine is something which at this time should demand our most serious consideration. I believe the future matriculation lists of our veterinary colleges will show a steadily increasing number of medical graduates, resulting from the more certain and rapid financial returns in both government service and private practice enjoyed by the veterinarian. We will find that many competent physicians, wearied by unsuccessful efforts to build up a paying practice in a reasonable time, will become attracted to our profession, and now is the time to consider what advance standing should be granted them. The writer thinks that in the consideration of the similarity of veterinary and human medical courses, that the man who has taken four years in a medical college, must indeed be lacking in some way, who cannot master the difference between the sciences in one year. Therefore, I do not believe that we will be making any mistake or will be sending out illy-prepared students by allowing a graduate of human medicine to enter our senior classes.

In regard to graduates of recognized agricultural schools, the custom has always been in the past to allow them one full year's credit, and it is well that such is continued.

Before leaving this question of entrance requirements, a few words must be said in regard to undergraduates in pharmacy, dentistry or agriculture applying for admission. Advance students in dentistry might possibly be given advance standing in certain subjects upon passing suitable examination. Undergraduates in pharmacy and agriculture do not seem to me to be entitled to any special consideration and should be compelled to enter the freshman class on a par with any other student. Undergraduates of human medicine should be placed according to their individual qualifications after suitable examination or investigation.

In respect to allowing advance standing to such applicants who ask for special consideration, simply on the strength of a number of years of practical experience or the possession of a State Board license to practice, the writer believes that we cannot be too firm in compelling such applicants to take the full three-year course without any credit whatsoever, as it has been the experience of all of us who have taught for any length of time, that it is more difficult to knock out the fool ideas entertained by the so-called practical veterinarian or quack, than it is to equip an entirely inexperienced man. And if it were in my power to do so, I would compel such men to go four years instead of giving them one or even two years' credit, as some colleges seem to be in the habit of doing.

In presenting this paper, there is no intention of criticizing any individual college, but as we all well know, our past conduct of intercollegiate affairs has been so chaotic, so utterly devoid of unity, that even with the most kindly feeling toward all, my words may be misconstrued by some as being spoken in a spirit of harsh criticism or antagonism. The truth necessarily hurts at times, and in laying bare the mistakes which all of us have made in the past, my only object is to make a plea for the avoidance of such mistakes in the future, and I hope these suggestions will be accepted in the same kindly spirit in which they are offered. But nevertheless criticism, and indeed more severe criticism, than I have the temerity to offer, is in order when the subject of accepting the time of entrance and the bona fide credentials from one school to another, or from one year to another, is approached. If there are any matters in which most of the colleges have shown an utter disregard for the ethical rights of or proper respect due to other colleges, it is here. The fight for students is so keen that many of the college faculties have resorted to schemes to fill their classroom seats which would not even be countenanced by ordinary sharp business practice, and I regret to say many have stooped to tricks in their college enthusiasm as faculties which I am quite sure they would never permit themselves to do in their individual outside dealings. Many schools have allowed students to enter from one month late to within one month of the end of the term and give such students credit for a full session's work, permitting them to enter the next class without questions. They have admitted men coming from other schools to advance standing simply on presentation of a fee receipt or matriculation card, irrespective of their qualifications or rights to enter such advance class. They have allowed men to enter their advance classes from one to three months late, giving them credit for a full year's work. They have allowed men to enter their senior classes after the holidays, guaranteeing to graduate them, without any investigation of their past work in other schools; simply accepting their work or credentials without finding out whether such were genuine or forged. Some schools have not alone passively allowed students to enter their classes under such circumstances, but have gone further and have offered inducements, both financially and otherwise for students to leave some other school and enter theirs.

Now, gentlemen, I submit to you, is this state of affairs right? Is it just to the colleges, to ourselves as individual teachers or to our students? Nor let us forget that there is a solemn duty which we owe the public, by whose grace we enjoy our corporate existence as colleges, to say nothing of the duty we owe the poor dumb beasts whose ills we are preparing men to alleviate. The time has come when our carelessness in this regard must be stopped, all the more so, because the error is so easy of correction. If it were permitted me to offer a few suggestions for corrective measures, in this regard, I would do so as follows:

1. No man should be allowed to enter any class after the first thirty days of the session, except upon examination of the work covered to that date. After thirty days the proper officer of each college should submit a matriculation list of each class to the secretary of this Association, who should make it a matter of permanent record.

2. The several colleges should formulate a set of credential or credit cards for each year's work, and no veterinary student should be admitted to advance standing, upon changing schools, without presentation of such cards properly signed, and then only after the credentials have been verified by a correspondence between the two interested schools or the secretary of this Association. This plan would become more effective by the various schools making their courses as uniform as practical.

3. No college should issue credit credentials to any student for any given year's work unless such student has put in a certain number of hours, the minimum to be fixed by this Association; not to one who has not taken the final examinations for the year's work in which he wishes to receive credits.

4. Every candidate for graduation should be compelled to take the entire senior course in the college from which he desires

a diploma. This rule to be strictly enforced. No school should have the right to take in a student the last three months of the senior year and graduate him.

I do not say the foregoing rules are just as they should be, simply believing that they are steps in the right direction and that some such set of rules should be adopted by this Association, and every college obligated to adhere to them. The penalty attached to non-conformance to the regulations adopted by this Association should be left to the various state examining boards and the executive board of this Association, the former blacklisting such offending institutions and the latter suspending or expelling them from membership.

It may be contended by some that strict adherence to such rules will work a hardship on most of the colleges second only to that of too high entrance requirements. But a few moments of calm consideration will show them that this is not the case. There is always a certain percentage of students who for some reason or other, circulate from one school to another, and past experience has shown all of us that the majority of such students are malcontents or incompetents and their acquisition usually more a matter of regret than of satisfaction. The enforcement of such rules will tend to lessen the percentage of such floaters, or else force them entirely out of a profession which they rarely ever learn to adorn. Such rules will work no financial hardship on colleges which aim to be scientific teaching institutions instead of mere money-making diploma mills.

It had been my object to say something upon the question of study requirements for each year, but this paper has already attained such lengthy proportions that I will forego doing so, simply suggesting that the matter be taken up in the discussion which I hope this paper will provoke.

In conclusion, let us not be too hasty in our decision of the grave problems which confront us—problems which must be decided to insure the greatest benefit to the majority, not from a financial, but from a scientific and education point of view. Let us not be too radical, for in our present ardent zeal, we might be tempted to formulate rules which would be made only to be broken. Let us not shackle ourselves with regulations which would but prove irksome and of necessity be ignored. On the other hand, let me be not misconstrued as advocating that conditions should remain as they have been in the past. There must be a change, and a decided change for the better. American veterinary colleges have outgrown the embryonic stage. They have passed the point when they are considered as simply schools for turning out animal doctors, and we must, by bettering ourselves, show the public that the good opinion which has been formed of us is not erroneous. If for no other reason than purely selfish motives, reforms must be instituted. If we conduct our intercollegiate affairs much longer in the same careless, slipshod, selfish manner in which we have conducted them in the past, the life and integrity of each individual school will be seriously menaced, as the prospective student of the future will find it to his own best interests to go to the school which offers the best, scientifically and ethically, and not the one which makes it the easiest for him to slide through, regardless of science or ethics.

And so one will see that conditions will narrow themselves down to a survival of the fittest, and only such schools will be the survivors as uphold most conscientiously their ethical intercollegiate relations. But on the other hand, we cannot expect that all things will become as they should be, or as we would have them be all at once, and although the Deity was able to create the heavens, earth and waters on command, we poor mortals must be satisfied to work out our desires more slowly, and, like the infant, we must creep before we can walk, and walk before we can run.

I trust this Association of Veterinary College Faculties and Examining Boards in its wisdom will make the reforms progressive rather than abrupt.

RECOMMENDATIONS OF COMMITTEE APPOINTED TO CONSIDER PAPER OF DR. G. H. ROBERTS.

1. We recommend that the colleges shall issue to students at the end of the college term a certificate showing the number of class hours given to each subject and the percentage grade therein.

2. We recommend that the entrance examination to colleges shall be at least equivalent to a second grade civil service basic examination.

3. We recommend that colleges do not allow students to enter any class after the first thirty days of the session, except upon examination of the work covered to that date. After thirty days the proper officer, of each college to submit a matriculation list of each class, showing basis of admission or advanced standing, to the Secretary of this Association who shall make it a matter of permanent record.

4. We recommend that the several colleges formulate credential or credit cards for each year's work and that no student be admitted or

given advanced standing, upon changing colleges, without presentation of such cards properly signed. If the student be admitted on such credentials, that the same be verified by correspondence with the proper officer of the college issuing the same.

5. We recommend that no college should issue credit cards to any student for any given year's work unless such student has taken the class work and final examinations in the year's work for which he shall receive credit.

6. We recommend that a student of medicine, in any of its phases, may be given credit for that part of a veterinary course which he has had that is parallel and equivalent to the course given in the college to which he applies for admission, providing that the applicant presents acceptable credit cards to be kept on file and subject to inspection by duly authorized representatives of the Association.

(Signed) S. Stewart,
J. H. McNeil,
W. H. Kelly.

THE PREPARATORY EDUCATION OF VETERINARY STUDENTS.

By W. L. WILLIAMS,
Ithaca, N. Y.

In estimating the strength of a veterinarian or member of other profession our attention is directed prominently to three important factors:

1. His personality; his mental capacity, character, integrity, vigor, prudence, enthusiasm.
2. His academic or preparatory education.
3. His scientific or professional attainments.

Some emphasize one of these, others believe another the most important, but in our dealing with the second we shall draw no comparisons with the other two and shall regard each of the three as alike essential to efficiency.

The preliminary training of the student has from the first constituted a complex problem in American veterinary education. and no substantial agreement has yet been reached in either theory or practice. In a majority of American veterinary colleges the matriculation requirements are elastic and evasive, and any definite entrance demands are darkly veiled beneath a "Common School Education" which may be made to mean anything or nothing as the interested parties may elect. Neither are we to hope for any accord in this direction until we reach a common ground also in reference to character and professional training.

If we are to admit to our veterinary colleges the dissolute and dishonest, the mountebank and charlatan with the same freedom or satisfaction that we do the highest type of young men; if, after admitting students to college classes, we offer a course of instruction which fails to enable them to secure an efficient professional training, then high matriculation requirements are in part or wholly wasted.

Hence, in discussing the problem of preliminary education, the other two factors suggested need be kept in view since all three must be kept in harmony.

The aims of preparatory education for a profession may be expressed in two ideas which followed closely ultimately converge and become essentially identical. On the one hand, it is held that the academic education demanded for entrance into a veterinary college should have for its chief or sole aim an enabling function through which the student shall be prepared to understand and profitably pursue the professional subjects, while others value academic training chiefly for the culture and refinement it affords and by which the veterinarian is largely enabled to assume higher social rank in his community. The two thoughts need not be antagonistic. An education which will enable a man to pursue an advanced course in veterinary science with the greatest profit also fits him to assume a position in his community as an educated gentleman; any course which insures to the student a liberal education at the same time contributes to his ability to acquire sound professional training, but when not designed intelligently to that end may not have the same practical value in a technical education.

The matriculation requirements of American veterinary schools are as variable as their courses of study, character of equipment or faculty.

The extremes may well be illustrated by the Ontario Veterinary College which for many years demanded for entrance an examination in "Reading and Writing," and the neighboring colleges in the State of New York, which under a state law demand four years of satisfactory high school work. Between these two technical extremes every possible variation occurs both in theory and practice.

While the two requirements cited appear very wide apart, the actual difference depends largely upon the interpretation of the terms. Reading and writing are very indefinite terms and the rule can be applied with great elasticity. A five-year-old child who reads from a primer "The dog runs," and can express it in characters which may be interpreted, may be said to be able to read and write, and has proven his claim by reading and writing. At the opposite extreme the rule could be so interpreted so as to comprise a thorough knowledge of the English language, ability to read and properly understand its highest and best literature and to write it readily, correctly and fluently. Such an interpretation would surpass in some very important respects the apparently much higher requirements of New York.

Veterinary colleges in the State of New York may admit students upon Veterinary Students' Certificates issued by the Regents or State Education Department, but these are not mandatory and the college may make further demands upon the student before registering him, although in practice they are admitted without further question in reference to preparatory education. In one, if not both of the New York schools, the universities of which they each form a part have a very excellent rule by which any student who is markedly deficient in English may be excluded, which has not yet been too drastically applied to matriculate in the veterinary colleges.

The quantity and quality of preliminary education to be demanded needs be based primarily upon our interpretation of veterinary science. Two distinct and divergent views of veterinary practice are held in America; one group maintains that it is a profession, the other that it is a trade. Each party is correct; some practitioners belong to the one, some to the other. He who intelligently, earnestly and efficiently studies veterinary science in college and in practice, and renders proper service to the live-stock owners and the community, belongs to a highly honorable and honored profession; he who memorizes a few empirical rules by which certain symptoms demand the application of given remedies and authorize the collection of fees, it becomes a trade or avocation and a very poor one at that. In discussing our subject we shall aim to confine ourselves to the student who hopes to become a part of an honorable profession, and to the college which aims to have its graduates shun the veterinary *trade* and enter the *profession.*

Language constitutes the chief means for communication between man and man, and teaching is accomplished almost wholly through its agency, whether it be in classroom, laboratory or clinic. If the student would profit by a lecture he needs to understand the language of the teacher and to be able to place some of the thoughts in a permanent form upon paper; if he would learn from a textbook, if he would learn from a library, he must understand the language of his author. When the student has learned his text or received other instruction, he must employ language as the chief means of expressing the knowledge which he has acquired, and it is through this expression of thought in language that the teacher must chiefly judge of the work of the student and later constitutes our best basis of measuring the practitioner. The first and greatest essential in preparatory education is that of language, of that language in which the study is to be prosecuted. With the exception of Laval University and its alumni, English is the language of American veterinary education and practice, and should take precedence over any or all other preparatory studies. Education consists chiefly of an acquisition of the knowledge and thought of others, verified and elaborated by personal experience and observation. The student needs have such preliminary training that he may clearly comprehend the teachings of writers and lecturers; if these are to be of a high order then his command of language must be of corresponding efficiency.

It is not easy to apply a fixed standard of measurement to acquirements in language. Two, three or four years of English in a high school insures the contact of the student with representative English literature by the best authors, but it cannot assure us that he has learned the language. Inferentially some knowledge of English has been acquired else the student fails to pass the required examinations in this and other subjects, but frequently it is with a low mark which signifies a poor command of language. Only a small minority of American veterinary colleges emphasize English as among the requirements for entrance but others apparently demand it by implication. The New York law makes no specific demands upon this point, but as a matter of practice high school graduates include among their studies more or less extended study of the English language and literature, and even in the technical absence of this, the pursuit of other branches necessarily involve the use of the language and some degree of proficiency is assumed to follow as a logical sequence.

Veterinary science is a world science and veterinary knowledge is recorded in many languages. The most and best veterinary literature emanates from Continental Europe, where the governments have long supported veterinary education liberally and consistently for its value to the nation. A very large and important part of our standard English veterinary literature is translated, extracted, borrowed or otherwise obtained from European authors, and yet only a small part of this finds its way into our language after important delays or through imperfect translation. The volume of meritorious veterinary literature in the German, French, Italian and Scandinavian languages is so great that the successful veterinary student needs have command of one or more of these, especially of German or French, and we consider the college or teacher having the professional success of the student at heart should at least point out to him the great importance of a preparatory working knowledge of one or more of these before entering upon his veterinary study. In addition to the command of language which we consider so essential as a preparation for the study of veterinary science, there are other subjects of a preliminary character which need be mastered before the student can properly comprehend the purely professional subjects. Veterinary study and practice frequently comes into close relations with the natural sciences.

An elementary knowledge of physics is essential to a clear conception of anatomy, physiology, and in many ways in the mechanical handling of disease.

Botany has a wide interest in the study of animal foods, of organic drugs, and of poisonous plants, and a majority of the infectious diseases are due to the growth of vegetable organisms within the tissues of the animal body.

Zoölogy includes within its field the domestic animals themselves, their organization, habitat, food, methods of feeding, the changes wrought in them by food or other conditions. It embraces a long list of animal parasites of that higher group known as entozoa and epizoa, those parasites which in addition to their direct injuries also act as the bearers of other smaller parasites like the trypanosomes by the mosquitoes and finally the protozoan group of disease-producing organisms.

Chemistry holds an important place in the preliminary education of the veterinarian. Elementary chemistry is essential to a due conception of the composition of foods, medicines, poisons and of the secretions and excretions of the animal body.

We have mentioned briefly those studies which seem directly essential as a basis for the advantageous study of veterinary science; the languages supply the means for the interchange of ideas, the sciences constitute the foundation for veterinary education.

In addition to the studies suggested many others could be added with great benefit by affording a liberal education. The A. V. M. A. has placed its seal of approval upon the excellent preparatory work accomplished by the agricultural schools and recognizes graduation from these as entitling the student to an allowance of one year in the veterinary college course and in practice the veterinary colleges are always anxious to admit these men on as liberal terms as possible, finding them preëminent in their veterinary classes.

Such preliminary education as we have outlined fulfils alike the needs for efficiently studying veterinary science and the recognition of the veterinarian as an educated gentleman. It is essential that the latter object be kept constantly in view since our profession cannot make the desired advances until the social position of the veterinarian is recognized as secure and honorable. Young men of refinement and education cannot be expected to enter the profession in large numbers unless they can be assured, as they can, that they will be admitted cordially into just as good society as veterinarians as they would be in any other profession or calling. College degrees cannot give a man social position else it would be easily acquired through high-sounding veterinary degrees so liberally bestowed. Legal enactment cannot secure social prestige, else some of our state veterinary laws would work wonderful effects upon certain of the veterinary practitioners. The A. V. M. A. has attempted to secure recognition and rank for the veterinarian in the U. S. Army but has failed perhaps largely because it was attempted by legal enactment to make an uneducated man the social and official equal of an educated one. The standing of a veterinarian in his community depends, not upon his college degree nor upon legal enactments supposedly in his favor, but upon his personal character, preliminary and professional training.

The completion of such a preliminary education as outlined would require three or four years of diligent high school work and would thus prolong the time necessary for the procuring of a veterinary degree. The time is not serious, however, in normal cases where the student attends school regularly, since he may accomplish his four years of high school work at sixteen years and still allow five years for professional study ere he attains his majority. A boy with good mental capacity and an earnest worker can finish his high school course followed by a four year's course in arts or agriculture and finish his veterinary course with an allowance of one year by the time he has reached the age of 22, surely young enough to commence his career as a veterinary practitioner.

The New York law, requiring four years of successful high school work, which technically stands in the front rank among the veterinary schools of America, is deficient in quality and kind. It places too high a value upon quantity rather than quality. Latin or Greek count for as much as German or French; higher algebra or geometry for as much as chemistry or zoölogy. In so far as they relate to a liberal education they are no doubt just as valuable, nor would we argue that they are not even better but for our specific purpose we consider them distinctly inferior.

Quality counts for naught except to pass, regardless of the duration of time required. A man may take each subject two or more times successively before he finally passes with marks barely sufficient to pass, but finally when he succeeds, he is just as eligible for entrance to a veterinary college as the brightest and best of the school. If a man is studying English and barely passes for four successive years he is probably a far poorer English scholar from the standpoint of efficiency than he who has passed one year with high honors, yet the man with four years' credit has four times the entrance credits that his superior fellow student possesses, and each of these credits counts for as much with low marks as with high. It is a difficult objection to overcome which is analogous to the student in the veterinary college who requires one or two extra years to limp through the veterinary college, his first year subjects forgotten before the last ones have been reached, yet he holds his place and drags himself through college to later continue to drag along through the world. We believe that a great advance could be made in the requirements of all those colleges demanding more or less high school education by stipulating that certain specified branches be included and that an allowance be made for quality. We would have English more highly valued for admission than Greek and would regard a mark of 95 in one year of English worth as much as a bare pass in two years in the same subject.

Various objections are raised to the demanding of such preliminary education as suggested. It is claimed that the social position and the emoluments of veterinary practice in America do not warrant the expense, time and labor. Here and there we have enough of such veterinarians to disprove the claim. If any individual veterinarian is singled out for comparison it will be found that his standing is quite as good in his community as though he were a member of other profession of vocation. In European countries where the preliminary requirements for the study of veterinary science are high, the members of the profession stand correspondingly high in their respective communities, in practice, in civil and military service.

The American veterinarian comes more and more in contact with broadly educated men. The enormous development of agricultural education has resulted in a large proportion of the leading farmers and stock breeders taking degrees from agricultural colleges, preceded by graduation from a high school; the leading merchants and business men who own animals, if not university graduates, are at least liberally educated. The veterinarian cannot meet these upon equal terms except with approximately equal education.

Invasion of fields logically belonging to the veterinarian are now and then threatened by the agriculturist because of his higher and better education, consisting of four years each of high school and college or university work. We have been told that in some States the authorities prefer, for tuberculin testing, and hence for the control of bovine tuberculosis, the agriculturist to the veterinarian, simply because of his more thorough scientific training.

The veterinary service in America is everywhere defective and fragmentary. In the cities there are rules for the handling of corns and quittor probably a trifle in advance of half a century ago, but among fresh horses from the western farms, exposed during shipment and disposal to a number of deadly contagious maladies, there is virtually no plan for control, and the losses from this one group of affections cost the American people millions annually; each year enough to far more than pay the total equipment and cost of maintenance of all our colleges put together, and they will never be controlled until we have a more efficiently educated body of veterinarians. Conditions in the country are quite as bad if not far worse. A case of dystocia or retained afterbirth is handled approximately as it was by the cow leech of a century ago, infectious abortion is almost not handled at all, and sterility is treated by mysterious impregnation concoctions dispensed by veterinarians whose education consists wholly of a big degree. Over the whole field of veterinary practice only a part of the cases are handled at all, and there is scarcely an area which would not to-day afford abundant room for the addition of an equal number of veterinarians without affecting the practice of those already occupying the field. But the men for this task must be of a higher type than those now existing and must be prepared to take up the work now left undone by existing veterinarians.

It is objected that men so highly educated as those we have suggested will not enter the filthy cow stable or pig sty to accomplish the needed work, and that for such duty it is necessary to have a more ignorant man who will blend with the filth. On the face of it the objection is untrue. If you would consult the literature upon the diseases under these filthy surroundings you must turn to the writings, based upon the experiences, of highly educated men. True the ignorant and dirty practitioner goes into these places, but we have no record of improvement as a result of it; the pig sty or cow shed is none the cleaner or better for it and he so blends with the filth that his presence passes unnoted. The educated and efficient veterinarian enters the filthy places a clean person and emerges clean, he preserves his identity and dignity, he dispels the filth and replaces it with cleanliness, he modifies the conditions, he produces results.

In a recent conversation with a graduate of a leading school he complained that the maximum fee he could command for removing a putrid afterbirth from a cow was $1.50, because a competing cow doctor did it at that price. Questioning revealed the fact that they did the same kind of work. They went dirty into the filthy cow stable, wore dirty clothes for the operation, found the cow dirty, left her dirtier when they came away, were no cleaner themselves for their experience and relied upon the antagonism between various forms of bacteria for disinfection. This is the type of veterinarian to which the argument of a poorly educated man for dirty work leads. The opinion was promptly and frankly expressed that he was receiving as high fees as his services warranted and suggested that for better remuneration there should be exhibited a higher sense of cleanliness, of education and culture, in harmony with his college teaching. Later advices indicate that the suggestion is being carried out with satisfactory results.

It has been further objected that a demand for such preparatory education would exclude many highly meritorious young men from the profession. Education of every grade, including veterinary science, is free in America, and there has not recently been a time when any healthy, intelligent young man could not acquire such learning as he desired. We have not known a young man who failed to get an education because of financial want. In every high school, college and university in the country there are plenty of young men and women who are earning their way and securing a good education.

It may be said with justice that the veterinary colleges themselves are not at this time fully prepared to give an education in harmony with the preparation outlined, but they will probably be able to adjust their work as rapidly as the preparatory requirements can be advanced.

If we search amongst the alumni of the various colleges it will be quite uniformly found that the most honorable and conspicuous positions are held by those who possess a liberal education.

If our current veterinary literature is examined it will be almost universally found that the meritorious articles emanate from those men who possess a good academic education.

Less than 50 per cent. of American veterinarians subscribe for any veterinary periodical; they purchase no new books, they attend no veterinary association meetings, they read nothing, they write nothing, they are *in* the profession but not *of* the profession. Almost without exception they are the men without academic education; they do not have it because they are either too lazy or too dull. Yet the colleges and the profession is responsible for them.

It is charged that those colleges demanding high entrance requirements are not well patronized by students and the charge is all too true, but the explanation does not lie in that alone or chiefly. High entrance demands are confined to state colleges or to those where the State has enacted laws making such requirements mandatory. The majority of these colleges have faculties greatly limited in numbers, handicapped by a want of practical experience; the buildings and equipments have generally been defective, their command of clinical material limited. Yet they are accomplishing a work destined to elevate and make better the veterinary profession, and as soon as the States conducting these institutions extend to them ample support, so that their college work may be made as good as their entrance requirements, the criticism will cease to have whatever weight it now possesses.

From the standpoint of the student all observation and recorded experience indicates that it is to his advantage that he acquire a liberal academic education before entering the veterinary or any other profession. If unfit to complete with credit a high school course, he is incapable of taking an honorable place in veterinary practice. We speak of ours as a "learned" profession, but it cannot be so unless its members are educated. Admittedly a high academic education alone does not insure a successful veterinary career, nor does character or professional education. As stated at the outset the candidate needs the three in ample degree. We observe technically highly educated veterinarians who are failures for want of character or good common sense. On the other hand, it is claimed that men have succeeded as veterinarians who have had very poor academic preparation. But if those men are carefully studied it will be found that they have an equivalent knowledge which we should always accept. If the daily-life of a man places him in constant contact with educated people, if he habitually reads good literature, observes and studies everything about him, he acquires a liberal education even though his school attendance may have been insignificant, and the fact that he has so acquired it, has become self-educated, is an indication of inherent vigor and power in him. It is the same with the course in a veterinary college; the worst diploma mill may occasionally turn out a man of force and efficiency, but the college did not make him; it merely failed to keep him from making himself. Schools, colleges and universities are not maintained because they are the only avenue by which men may get an education, but that they are by far the most efficient, prompt and economical. In reality the successful veterinarians are very largely self-made, viewed either academically or professionally.

We hold that the colleges owe the public more efficiently educated men. In some callings a man learns his work through direct experience, but in doing so spoils little if any material and merely accomplishes a small amount of work as an apprentice. When a man is graduated in veterinary medicine he should be prepared at once to do efficient service, but our practice has been to give the student some of the so-called fundamental principles and then turn him loose to learn the practical part at the pain of his patients and expense of their owners. One of the chief means for overcoming this defect is by securing higher preparatory education in order to enable him to better grasp his professional studies.

Opinion may vary and surroundings may change the advisability as to where and how this preparatory education should be obtained. The New York law permits students to enter with conditions provided they are passed off before the beginning of the second collegiate year. The plan has advantages and disadvantages. It offers advantages to mature and capable men who fall but little short of the requirements and can make them up without serious hindrance to the efficiency of their work during their first year. If we regard preparatory education as an enabling provision through which he is better prepared to grasp his professional subjects, entering on condition destroys the value of such education at the very point where it is the most essential, for the first year poorly done is a handicap not removed during a college course. If the conditions are heavy the man who can overcome them and do his year of collegiate work well is a Hercules. Usually in our experience, heavily conditioned men stagger along in their first year, many of them fail, are forced out of college and turn to colleges demanding low or no preparatory education, or remaining, rarely recover during the entire course to a sufficient degree to do their work in a creditable manner. Except in case of very light conditions or in extraordinary instances our advice is against registration with conditions.

One method of securing the desired academic education is that adopted by the Kansas and Washington institutions where they are taken as a part of the prescribed college course. To this no very great objection appears upon the surface. The State furnishes the education both academic and collegiate, and if it can do it better or cheaper in the college than in the high school there can be but little objection. A minor criticism is that such a plan gives the appearance of a four-year professional course when as a matter of fact it is shorter in veterinary study than some of the three-year colleges. A study of their curriculum reveals the true condition and places them among the three-year colleges with high entrance requirements where they properly belong.

In the New York scheme elementary chemistry may be counted as a preparatory study for entrance or taken in college and count towards graduation or serve the double purpose of counting in each place. It is a required veterinary study, and candidates for state license must pass an examination in it before the State Board of Examiners. Nevertheless, elementary chemistry properly belongs in a preparatory and not in a veterinary course. On the other hand physiologic chemistry, the chemistry of foods, medicines, poisons, etc., have a direct and important place in veterinary education, and the elementary study must serve as a basis. Elementary chemistry is of scant value as a preparatory study, aside from affording a liberal education, except it is followed by the applied subjects. The same may be said of elementary botany and zoölogy. They lose their direct value as enabling studies unless the professional courses use them as a basis for distinctively veterinary branches. High preparatory requirements become largely a farce so far as they form a foundation for veterinary study, unless the studies for which they form the logical basis are given in a corresponding manner, but the high requirements still retain a value in contributing toward a liberal education and indirectly enable the student to more successfully pursue his professional education and career. The solution of the problem of higher preliminary education for veterinary students is not easy of accomplishment.

The first step in securing any reform is a frank acknowledgment that it is necessary. If veterinary colleges would openly and earnestly advise intending students that it would be greatly to their personal advantage to secure a good academic education before entering college it would go far towards solving the problem. If each and every college would say as much in their announcements about the advantages of a good preparatory education as they do to laud the excellencies of their buildings, courses, equipment and faculty, they would aid the advancement of veterinary education very greatly.

If this Association could bring about a general agreement that each college taking part in its deliberations should recommend through its official publications that the intending student should first secure a good academic education before entering college, it would exert an excellent influence even though such colleges continued to accept them without the preparation advised.

Our most influential force in this matter is the American Veterinary Medical Association. If we could induce this association to approve a plan for the preparatory education of veterinary students which would be enforced by the granting or refusing of membership to the alumni of the college, it would go far toward the correction of the evil. A plan is now in force by an association of eastern universities by which entrance examinations are held at stated intervals by a board representing the association, and the results of such examinations are accepted alike by all universities belonging to the association so far as they relate to a given subject. This does not prevent each university from admitting students upon examinations conducted by the individual institution.

The American Veterinary Medical Association could demand that a certain quantity and quality of preliminary education of veterinary students should be required by colleges in order that their alumni shall be eligible to membership, or it might enact a rule that only such persons who as students have passed a prescribed entrance examination shall as alumni be eligible to membership in the association.

A change from the present chaotic condition could be only gradually made. A start could be made by requiring a reasonable examination in English, to be followed as soon as judicious by a more rigid test, after which there could be added some of the sciences or a working knowledge of German or French and finally after some years, the full preparatory education suggested could be demanded. Such a plan would bring about a gradual change without serious injury to any well-meaning college, while it would appeal to the profession and public through the increased efficiency of the graduates. Presumably some low-grade colleges would continue just as correspondence schools, and diploma mills now exist, but their influence is very slight and need not be seriously considered. In order to make such a plan effective it would be advisable to first have the support of a majority of the reputable veterinary colleges or of those colleges having a majority of the veterinary students.

It might not be essential to require that *all* students entering such colleges should pass such an examination by a central examining board, but if it were required of a majority of these it would create a sentiment in favor of such requirements which would act powerfully toward extending the rule and making it universal for the college. It would soon be found that the men with good preparatory education were the successful students.

In such a plan, a uniform minimum requirement could not be permitted to act upon those colleges already exceeding such demands. Those colleges already requiring high entrance education would necessarily be unaffected by this rule except in some particular they fall short. If the requirements in English should be advanced beyond the demands of New York, those colleges would necessarily become affected by the rule; if German or

French is required by the general rule, then New York would need comply or lose place in the association.

We believe that the time for action has come and that this association should recommend to the American Veterinary Medical Association some prudent plan for advancing the matriculation requirements in veterinary schools, that the advance should be prompt and decisive, but not revolutionary.

REPORT OF COMMITTEE TO CONSIDER PAPER READ BY DR. W. L. WILLIAMS.

Resolved:

1. That this Association recommend that the American Veterinary Medical Association create a Veterinary Matriculation Board to consist of three members to be appointed by the President, the members of the first Board to be appointed for one, two and three years respectively, after which the President shall appoint one member annually to serve for three years.
2. The said Board shall prepare suitable questions for veterinary matriculation examinations which shall be furnished to the colleges concerned and the answers thereto returned to the Board for review.
3. The examinations by this Board shall at first be limited to an ample test of the candidates' knowledge of English, which shall be increased to include other subjects from year to year as the Association may direct.
4. The American Veterinary Medical Association shall not admit to its membership the alumni of veterinary colleges which fail to conform to their admission of students to the minimum requirements established by this Board.
5. The said Board shall be authorized to establish such rules and regulations as are necessary for carrying out the provisions of these resolutions.
6. This rule shall take effect January 1, 1908.

(Signed) D. S. WHITE,
G. R. WHITE,
L. A. MERILLAT,
C. E. COTTON.

EXAMINING BOARDS AND ENTRANCE EXAMINATION.

By GEO. R. WHITE,
Nashville, Tenn.

I have been selected or assigned by Secretary Butler to open the discussion at this meeting upon the following hypothetical question: "Is it practical for State Examining Boards to frame their questions for license to practice so that the answers of applicants thereto may indicate a general educational knowledge equivalent to the college entrance examination, which this Association determines shall be maintained?"

In the discussion of this particular phase of the function of an examining board and their ability to test the knowledge of a candidate, especially at the time of his matriculation, we are confronted with several questions difficult of solution. Much depends upon the shrewdness, ability and experience of the examiner himself. Some, of course, depend upon the examiners's interpretation of the requirements of this Association. Much depends upon the latitude allowed the examiner by the particular State Statute under which the examination is being conducted. In my opinion such a test is not practical and should not be depended upon in any sense.

As a member and President of the State Board of Veterinary Medical Examiners of Tennessee, I would not care to assume the responsibility of testing the matriculation requirements of veterinary educational institutions in the manner indicated by the question now under discussion.

One of the principal functions of a State Examining Board is to protect the profession so far as possible from imposters and illiterates. This can only be done by so framing the questions as to test the candidate's knowledge of veterinary science. It is comparatively easy to ask questions in such a way that when answered will indicate in a general way a candidate's educational attainments or his fitness to practice veterinary medicine and surgery.

I think that a candidate's application for license should reveal the college from which he graduated, and the general reputation and standard of that school should receive due consideration at the hands of the Examining Board.

So long as the A. V. M. A. have no hard and fast rules and regulations or requirements for the recognized colleges to live up to, how are members of the State Boards to be guided in framing their questions, even though they proposed or desired to pass only those candidates who are graduates of colleges upon which this Association has placed its stamp of approval or recognition.

Of course I am an amateur so far as examination of candidates is concerned; possibly Dr. Hoskins or some other experienced State Board Examiner can give us all valuable pointers in the mode of how to proceed in a proper way to unmask the candidate for examination and license.

THE ENFORCEMENT OF VETERINARY PRACTICE LAWS IN CONNECTICUT.

By THOS. BLAND,
Waterbury, Conn.

The Connecticut Veterinary Medical Association had for a number of years urged the passage of an act by our Legislature regulating the practice of veterinary medicine. Committees were appointed, and after many years of earnest work a law has been placed upon our Statute Books which unquestionably is a nucleus for something better.

Strong and vigorous opposition was always encountered, which was principally due to the fact that in many of the smaller communities there were numerous *assumptives* with no education or veterinary training whatsoever, who treated their neighbors' animals for little or no compensation.

The majority of the members of our Legislature were farmers or representatives of the agricultural interests. To secure the passage of any law whatever regulating the practice of veterinary medicine, it was necessary that every graduated veterinarian should meet and discuss this question with the members of the Legislature in their district. This was done pretty thoroughly.

Finally, at the session of 1905, we were able to secure the passage of a law providing for the appointment of a commission of five veterinary surgeons to act as a board of registration and examination.

The act provided that all persons engaged in the practice of veterinary medicine, surgery and dentistry at the time of the passage of the act might register on or before the first day of October, 1905, and should receive certificates entitling them to continue such practice.

Under this provision, of course, in most cases the board of examiners had little option or discrimination in the granting of certificates. The question before us was merely one of fact as to whether the applicants were actually engaged in such practice. It is proper to state, however, that under this broad provision, many unworthy men, in no way a credit to the provision, were able to secure a status as veterinary practitioners.

This was a very broad provision, but as it was the first law to be secured on this subject from our State Legislature, we were obliged to accept the act on the principle that one-half a loaf is better than none.

The act further provided that after the date on which the act went into effect, anyone desiring to commence the practice of veterinary medicine, surgery and dentistry should make application to the board, and should be required to submit to an examination as to his qualification on the following subjects: anatomy, physiology, obstetrics, pathology, therapeutics and the theory and practice of veterinary medicine. The act provided that the examination fee should be $10.00. Examinations are held by the board on the first Tuesdays of July and December in each year, and at such other times as the board may deem necessary.

There is a very objectionable feature in the law which exempts from its operation all persons who furnish medical or surgical assistance without compensation, or in an emergency. The law also exempts any person who does not represent himself to be a practitioner of veterinary medicine, surgery and dentistry.

The penalty for practicing veterinary medicine, surgery and dentistry in violation of the provisions of the law is a fine of $300 for the first offence, and for the second offence a fine of not more than $500, or imprisonment not more than one year, or both. This, in a general way, summarizes the provisions of our law upon the subject.

The law has been in operation for a little over two years, and in general, it has been obeyed. We have had a few complaints, but not formal ones. In my locality there were two violators of the law, but by informing the prosecuting attorney that these men were practicing illegally, a simple notification to that effect from him was sufficient to stop them from further violation.

We have encountered a large number of men who are graduates, so-called, of veterinary correspondence schools. These men, in all cases, have proven to be unfit to practice veterinary science, although in one instance a reputable man who had practiced and failed to register within the time allowed by law, did brush up with the aid of a correspondence school, and was able to pass the State Board's examination and receive his license. It is not the policy of our board to recognize the graduates of these so-called correspondence schools any further than necessity and the law requires.

I believe the law has discouraged and will further discourage men from entering the veterinary profession, except by a proper college education. It must always be observed that time alone will eradicate and eliminate the men who were able to register at the time of the passage of the act. As this class of men gradually drop out, the ranks will be filled with men who are graduates of reputable veterinary colleges.

Our course of procedure in case of violation of this act has not yet been fully determined. At the last meeting of the board of veterinary registration and examination, the secretary was instructed to investigate the matter of one persistent violator. As yet, we have not determined what action will be taken in this case.

It is the purpose of the qualified veterinarian to use every reasonable means to secure from the next Legislature an amendment to the existing statute, which will eliminate the provision which exempts from the operation of the law all persons who furnish medical or surgical assistance without compensation, or in an emergency, and those who do not represent themselves to be practitioners of veterinary medicine, surgery and dentistry.

VALIDATING ACT.

SECTION 14. Any person, who on or before October 1, 1905, was entitled to receive a license to practise veterinary medicine, surgery, and dentistry in this State, under the provisions of section three of chapter 183 of the public acts of 1905, and whose application for the license provided for in said section was otherwise legal except that, through inadvertence and mistake, said application was not filed within the time prescribed by law, is hereby declared entitled to receive such license without examination; and the board of registration and examination created under said act is hereby directed to issue such license; provided, application therefor was made on or before October 7, 1905; and the acts of any such person qualified to receive such license prior to October 1, 1907, and while practicing as a veterinarian, if otherwise legal except that such person failed to make application for such license on or before October 1, 1905, but did make such application on or before October 7, 1905, are hereby validated and confirmed.

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MEETINGS.

1863. First Meeting, New York, N. Y., June 9 and 10.
1864. Semiannual (comitia minora)—New York, N. Y., January 19.
Annual—New York, N. Y., September 6.
1865. Semiannual—New York, N. Y., March 7.
Annual—Boston, Mass., September 5.
1866. Semiannual—New York, N. Y., March 5 and 6.
Annual—New York, N. Y., September 4.
1867. Semiannual—Boston, Mass., March 5.
Annual—New York, N. Y., September 3.
1868. Semiannual—New York, N. Y., March 5.
Annual—Boston, Mass., September 1.
1869. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 21.
1870. Semiannual—Philadelphia, Pa., March 15 (no quorum).
Annual—New York, N. Y., September 20.
1871. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 19.
1872. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 17.
1873. Semiannual—Boston, Mass., March 17.
Annual—New York, N. Y., September 16.
1874. Semiannual—Boston, Mass., March 17.
Annual—Not held, owing to error in date of notices sent out.
1875. Semiannual—Boston, Mass., March 26.
Annual—New York, N. Y., September 21.
1876. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 10.
1877. Semiannual—Boston, Mass., March 20.
Annual—New York, N. Y., September 18.
1878. Semiannual—Boston, Mass., March 19.
Annual—New York, N. Y., September 17.
1879. Semiannual—Boston, Mass., March 18.
Annual—New York, N. Y., September 16.
1880. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 1.
1881. Semiannual—Boston, Mass., March 13.
Annual—New York, N. Y., September 20.
1882. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 19.
1883. Semiannual—Boston, Mass., March 20.
Annual—New York, N. Y., September 18.
1884. Semiannual—Boston, Mass., March 18.
Annual—Cincinnati, Ohio, September 16.

1885. Semiannual—Boston, Mass., March 17.
Annual—New York, N. Y., December 15.
1886. Semiannual—Boston, Mass. No legal meeting held. No quorum.
Annual—New York, N. Y., September 21.
1887. Semiannual—Philadelphia, Pa., March 15.
Annual—New York, N. Y., September 20.
1888. Semiannual—Baltimore, Md., March 20.
Annual—New York, N. Y., September 18.
1889. Semiannual—Boston, Mass., March 19.
Annual—Brooklyn, N. Y., September 17.
1890. Chicago, Ill., September 16 and 17.
1891. Washington, D. C., September 15 and 16.
1892. Boston, Mass., September 20, 21, and 22.
1893. Chicago, Ill., October 17, 18, 19, and 20.
1894. Philadelphia, Pa., September 18, 19, and 20.
1895. Des Moines, Iowa, September 10, 11, and 12.
1896. Buffalo, N. Y., September 1, 2, and 3.
1897. Nashville, Tenn., September 7, 8, and 9.
1898. Omaha, Neb., September 6, 7, and 8.
1899. New York, N. Y., September 5, 6, and 7.
1900. Detroit, Mich., September 4, 5, and 6.
1901. Atlantic City, N. J., September 3, 4, and 5.
1902. Minneapolis, Minn., September 2, 3, and 4.
1903. Ottawa, Canada, September 1, 2, 3, and 4.
1904. St. Louis, Mo., August 16, 17, 18, and 19.
1905. Cleveland Ohio, August 15, 16, 17, and 18.
1906. New Haven, Conn., August 21, 22, 23, and 24.
1907. Kansas City, Mo., September 10, 11, 12, and 13.

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1864–65.	A. S. Copeman, New York.
1865–66.	C. M. Wood, Massachusetts.
1866–67.	R. H. Curtis, New York.
1867–69.	R. Wood, Massachusetts.
1869–71.	E. F. Thayer, Massachusetts.
1871–75.	A. Large, New York.
1875–77.	A. Liautard, New York.
1877–79.	C. P. Lyman, Massachusetts.
1879–81.	J. L. Robertson, New York.
1881–83.	W. Bryden, Massachusetts.
1883–85.	W. B. E. Miller, New Jersey.
1885–86.	L. McLean, New York.
1886–87.	A. Liautard, New York.
1887–89.	R. S. Huidekoper, Pennsylvania.
1889–90.	C. B. Michener, New York.
1890–92.	R. S. Huidekoper, Pennsylvania.
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1902–1903.	S. Stewart, Missouri.
1903–1904.	R. R. Bell, New York.
1904–1905.	M. E. Knowles, Montana.
1905–1906.	W. H. Lowe, New Jersey.
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1907–1908.	W. H. Dalrymple, Baton Rouge, La.

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1867–69.	J. F. Budd, New York.
1869–74.	J. L. Robertson, New York.
1874–77.	J. D. Hopkins, New Jersey.
1877–80.	A. A. Holcombe, New York.
1880–88.	C. B. Michener, New York.
1888–93.	W. Horace Hoskins, Pennsylvania.
1893–94.	T. J. Turner, Missouri.
1894–95.	Leonard Pearson, Pennsylvania.
1895–1902.	S. Stewart, Kansas and Missouri.
1902–1906.	John J. Repp, Iowa and Pennsylvania.
1906–1908.	Richard P. Lyman, Connecticut.

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Revision of Article VI, Section 2, of By-Laws.

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Stein, A., M.D., 28 West Fifteenth Street, New York, N. Y.
* Thayer J. L., M.D.
* Thomassen, Prof. Dr. J. P.
Tsuno, Dr. K., Veterinary Department Imperial University, Tokio, Japan.
Weisse, F. D., M.D., 46 West Twentieth Street, New York, N. Y.
Welch, Prof. William H., Johns Hopkins University, Baltimore Md.
Wilcox, E. V., Ph.D., Department of Agriculture, Washington D. C.
* Williams, Prof. William.
Wisdom, W. A.

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* Deceased.

HONOR ROLL, REVISED 1907.

C. Burden, Organizer 1863, Secretary 1865–67, died 1901.
W. J. Coates, elected 1877.
C. W. Crowley, elected 1876.
D. J. Dixon, elected 1881.
Wm. Dougherty, elected 1874.
O. H. Flagg, Organizer 1863, died 1896.
R. H. Harrison, elected 1881.
W. H. Hoskins, elected 1882, Secretary 1888–93, President 1893–96.
L. H. Howard, elected 1882.
J. D. Hopkins, elected 1873, Secretary 1874–77.
A. Liautard, Organizer 1863, Secretary 1863–64, Pres. 1875–77 and 1886–87.
C. P. Lyman, elected 1875, President 1877–79.
B. McInnes, elected 1876.
F. W. McLellan, elected 1882.
J. C. Meyers, elected 1875.
I. Michener, Organizer 1863, made Honorary Member 1892, died 1899.
F. H. Osgood, elected 1881, President 1896–97.
J. Penniman, Organizer 1863, deceased.
J. L. Robertson, elected 1868, Secretary 1869–74, President 1879–81.
R. J. Saunders, elected 1871, died 1902.
W. A. Sherman, elected 1882.
J. H. Stickney, Organizer 1863, President 1863–64, died 1900.
E. F. Thayer, Organizer 1863, President 1869–71, died 1889.
T. K. Very, elected 1872, died 1907.
J. F. Winchester, elected 1878, President 1901–02.
Robt. Wood, Organizer 1863, President 1867–69, died 1891.
W. H. Wray, elected 1878.

ACTIVE MEMBERS.

Abele, Francis, Jr., 18 Spear St., Quincy, Mass.
Ackerman, E. B., 167 Clymer St., Brooklyn, N. Y.
Adams, John W., 4611 Springfield Ave., Philadelphia, Pa.
Ahlers, F. R., Lamotte, Ia.
Ainsworth, C. B., Greensburg, Ind.
Alcorn, Harvey A., Adair, Ia.
Allen, F. S., 800 N. Seventeenth St., Philadelphia Pa.
Allen, Stanley W., Watertown, S. D.
Allen, Thos. A., P. O. Box 541, San Juan, Porto Rico.
Althouse, E. P., P. O. Box 311, Johnstown, Pa.
Ambler, H. B., Walton, W. Va.
Anderson, F. E., 120 East Sandusky St., Findlay, O.
Anderson, J. S., Seward, Neb.
Andrews, F. W., P. O. Box 439, Mt. Kisco, N. Y.
Annand, J. G., Duluth, Minn.
Archibald, Robert A., 1724 Webster St., Oakland, Cal.
Armour, W. J., Goshen, Ind.
Atherton, I. K., care E. Godel & Sons, Peoria, Ill.
Atkins, C. E. C., 1192 Broad St., Bridgeport, Conn.
Axby, William A., Harrison, O.
Ayer, Don C., 1624 Howard St., Omaha, Neb.

Babb, Albert, 320 S. Eighth St., Springfield, Ill.
Babson, Elmer W., 341 Washington St., Gloucester, Mass.
Baker, A. H., 2537 State St., Chicago, Ill.
Baker, Lewis R., Live Stock Exchange, Kansas City, Kan.
Baker, M. C., 194 Milton St., Montreal, Can.
Barnett, Enoch, Clemson College, S. C.
Barnett, Joseph A., Edwardsville, Ill.
Barr, Frank H., Pana, Ill.
Barradell, A., Pawling, N. Y.
Bates, Elbert M., 814 W. Eighth St., Coffeyville, Kan.
Bates, Harry E., 11 Reed St., South Norwalk, Conn.
Bath, H. W., 150 Lafayette Ave., New Brighton, N. Y.
Bauman, Samuel H., Birmingham, Ia.
Baynes, Charles, 409 St. Helens Ave., Tacoma, Wash.
Beckett, Edw. C., 549 Albany St., Boston, Mass.
Beebe, Ward L., St. Anthony Park, Minn.
Beechy, L. P., Sioux Fall, S. D.
Beere, Charles H., P. O. Box 294, Waterbury, Conn.
Behler, Clayton R., Nampa, Idaho.
Behnke, A. E., care Stratford Hotel, Washington, D. C.
Belaire, G. H., Pembroke, Ontario, Can.

Bell, George W., Kingston, Ontario, Can.
Bell, Roscoe R., 710 E. Second St., Brooklyn, N. Y.
Bennett, S. E., 316 Live Stock Exchange, Chicago, Ill.
Berg, John A., Pender, Neb.
Berns, George H., 74 Adams St., Brooklyn, N. Y.
Bieber, U. S. G., Kutztown, Pa.
Bird, W. N. D., 25 Live Stock Exchange. Buffalo, N. Y.
Bitting, A. W., 320 State St., West Side, Lafayette, Ind.
Black, Judson, Richmond, Mich.
Blackman, G. B., Chattanooga, Tenn.
Blackwell, John E., 201 Main St., Hutchinson, Kan.
Blair, Wm. Reid, New York Zoölogical Park, New York, N. Y.
Blakely, Chester L., 58 Chapel St., Augusta, Me.
Bland, John W., 604 Robson St., Vancouver City, British Columbia, Can.
Bland, Thomas, Waterbury, Conn.
Blattenburg, J. H., Lima, O.
Blount, S. L., 909 W. First St., Fort Worth, Tex.
Bolger, David L., 26 Palmer St., Cambridge, Mass.
Bollinger, Alfred F., 24 Snyder Ave., Brooklyn, N. Y.
Boor, Orville L., 110 N. Walnut St., Muncie, Ind.
Borden, C. R., 7 Adams St., Taunton, Mass.
Bostrom, A., Miniden, Neb.
Bourne, Richard F., 1336 E. Fifteenth St., Kansas City, Mo.
Boutelle, Charles A., 21 Rice St., Newton Centre, Mass.
Boyd, H. W., Nyack, N. Y.
Bradley, E. W., Marlboro, Mass.
Brainerd, E., Memphis, Mo.
Bray, Thomas A., P. O. Box 364, El Paso, Tex.
Brenton, S., 121 W. Alexandrine Ave., Detroit, Mich.
Bretherton, W. C., 270 W. 126th St., New York, N. Y.
Bridge, Francis, 228 N. Fifty-third St., Philadelphia, Pa.
Brimhall, S. D., Redfield, S. D.
Bronson, Ely M., 2854 N. Senate Ave., Indianapolis, Ind.
Brooks, S. S., Hamilton Ave. and Sixteenth St., Brooklyn, N. Y.
Brown, E. N., 316 First Ave., N., Nashville, Tenn.
Brown, F. F., 1330 E. Fifteenth St., Kansas City, Mo.
Brown, H. W., 220 S. Champion Ave., Columbus, O.
Brown, Lyman D., Hamilton, Mo.
Browning, George W., 319 Goldthwaite St., Montgomery, Ala.
Browning, P. H., 61 N. San Pedro St., San Jose, Cal.
Buckley, John S., 205 Twelfth St., S. W., Washington, D. C.
Buckley, Samuel S., Agricultural Exp. Sta., College Park, Md.
Budd, T. Earle, 89 Park St., Orange, N. J.
Bullivant, James, Spokane, Wash.
Bundy, Edward A., care Nevada Packing Co., Reno, Nev.
Burling, Arthur Hanson, 274 S. Twenty-third St., Philadelphia, Pa.
Burnett, Jno. F., care N. W. Mounted Police, Regnia, Sask., Can.
Burnett, S. H., Ithaca, N. Y.
Burnham, F. E., 728 Ogden Ave., Superior, Wis.

Burr, Alexander, Old Court House, Boston, Mass.
Burrows, Samuel, 6411 Quincy Ave., S., Cleveland, O.
Bushnell, F. F., Middletown, Conn.
Butler, George W., cor. Main and Johnson Sts., Louisville, Ky.
Butler, J. S., Raleigh, N. C.
Butler, Tait, Raleigh, N. C.
Butters, J., Renville, Minn.
Byers, M. V., Osceola, Neb.

Caldwell, S. Hutson, care Canal Commission, Ancon, Canal Zone.
Carlisle, T. S., 8425 Germantown Ave., Philadelphia, Pa.
Cary, C. A., Auburn, Ala.
Case, J. C., Peconic, N. Y.
Cass, W. S., 3321 Eastern Ave., St. Louis, Mo.
Castor, Thomas, 4914 Frankford Ave., Philadelphia, Pa.
Cawley, A. O., Milton, Pa.
Chamberlain, Harry D., 1116 Whitney St., Belvidere, Ill.
Champlain, Lloyd, 3730 Park Ave., Kansas City, Mo.
Chaney, Bailey E., Monroe, La.
Cherrington, Kenneth G., 91 Tenth St., Providence, R. I.
Clancy, Joseph B., National Stock Yards, Ill.
Clark, Henry D., 15 Central St., Fitchburg, Mass.
Clark, Roy R., 310 Thirtieth St., Newport News, Va.
Clark, W. G., Marinette, Wis.
Clawson, C. A., Live Stock Exchange, Kansas City, Kan.
Clayton, C. E., 207 West Fifty-fifth St., New York, N. Y.
Cliffe, G. W., Upper Sandusky, O.
* Coates, W. J., 141 West Fifty-fourth St., New York, N. Y.
* Honor Roll.
Cochrane, R. E., 450 Greenbush St., Milwaukee, Wis.
Cole, William H., Broken Bow, Neb.
Collins, George J., West Point, Neb.
Collins, Robert E., 159 Monroe St., Memphis, Tenn.
Colton, Chas. L., 1260 Main St., Hartford, Conn.
Cook, J. W., 408 West First St., Duluth, Minn.
Cooley, A. S., 5609 Euclid Ave., Cleveland, O.
Connaway, J. W., Columbia, Mo.
Connell, Clare V., N. Second St., Decatur, Ind.
Copithorn, H. K., Chelsea, Mass.
Cornman, Ernest L., Marietta, Pa.
Cotton, Chas. E., 615 Fourth Ave., S., Minneapolis, Minn.
Cotton, T. Bent, Mt. Vernon, O.
Couture, J. A., 49 Garden St., Quebec, Can.
Cozier, Carl, 320 Prospect St., Bellingham, Wash.
Craig, R. A., Lafayette, Ind.
Craig, W. B., 45 Circle St., Indianapolis, Ind.
Crawford, J. H., Harvard, Ill.
Creamer, J. M., cor. Fifth and Taylor Sts., Portland, Ore.
Crewe, W. F., Devil's Lake, N. D.

Critcherson, W. D., 124 High St., Westerly, R. I.
* Crowley, C. W., 2912 Sheridan Ave., St. Louis, Mo.
Culver, Frederick W., Longmont, Col.
Cunningham, A. E., 416 Sibley St., Cleveland, O.
Curtice, Cooper, Raleigh, N. C.

Dalrymple, W. H., Baton Rouge, La.
Damman, A. J., 607 N. Main St., Ellensburg, Wash.
Darby, J. W., Fort Plain, N. Y.
Darling, Andrew, 3334 Pine St., St. Louis, Mo.
Daubigny, F. T., 380 Craig St., Montreal, Can.
Davis, Benj. F., care D. C. Ayer, So. Omaha, Neb.
Davison, D. A., 219 E. Water St., Princeton, Ind.
Davitt, M. H., U. S. Vet'ry Inspector, 2263 Mass. Ave., Cambridge, Mass.
Day, L. Enos, 316 Exchange Bldg., Stock Yards, Chicago, Ill.
Day, Wm. E., care D. C. Ayer, South Omaha, Neb.
Decker, E. J., 16 William St., Far Rockaway, N. Y.
Desmond, J., Adelaide, South Australia.
Deubler, E. S., 5413 Norfolk St., Philadelphia, Pa.
Devine, J. F., Goshen, N. Y.
Dickey, Elvon S., 513 Jones St., Sioux City, Ia.
Dimock, Wm. W., Santiago de las Vegas, Cuba.
Dingley, Ernest C., 2117 Locust St., Philadelphia, Pa.
Dinwiddie, R. R., Fayetteville, Ark.
Dixon, C. Price, Charlottesville, Va.
* Dixon, D. J., 366 Washington St., Hoboken, N. J.
Dodge, George A. Northwood, Ia.
Dodge, William H., Leominster, Mass.
Donald, James S., 212 S. Catherine St., Bay City, Mich.
Dorian, Frank P., 35 Franklin St., Yonkers, N. Y.
* Dougherty, Wm., 1025 Cathedral St., Baltimore, Md.
Drake, M. W., 1315 Wharton St., Philadelphia, Pa.
Drasky, J. J., Crete, Neb.
Drexler, Jos. L., Thibodaux, La.
Duchene, John D., 58 Rue du Pont, Quebec, Can.
Dunleavy, M. J., 1326 Acome St., Denver, Col.
Dunphy, George W., Quincy, Mich.
Dustan, Henry W., Morristown, N. J.
Dyson, Orion E., 4201 Halsted St., Chicago, Ill.

Eagle, Richard F., 332 Live Stock Exchange Bldg., Kansas City, Kan.
Eastman, Charles, San Luis Obispo, Cal.
Ebbitt, Richard, Grand Island, Neb.
Edwards, W. R., Vicksburg, Miss.
Egan, W. F., 1155 Golden Gate Ave., San Francisco, Cal.
Eichhorn, Adolph, Dept. of Agriculture, B. A. I., Washington, D. C.

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* Honor Roll.

Eisenman, F. T., 222 E. Main St., Louisville, Ky.
Elery, Wilton, Anita, Ia.
Ellenberger, W. P., 215 Federal Building, Nashville, Tenn.
Elliott, H. James, Brandon, Manitoba, Can.
Ellis, James E., Rosalia, Wash.
Ellis, R. W., 509 W. One Hundred and Fifty-second St., New York, N. Y.
Emerson, Daniel, Lynn, Mass.
Estey, Cyrew B., St. Cloud, Minn.
Etienne, A. A., 67 Drummond St., Montreal, Can.
Evans, Calvin S., care Bureau of Animal Industry, Sioux City, Ia.
Everett, A. T., Twenty-fourth and North Sts., South Omaha, Neb.
Eves, H. P., Wilmington, Del.

Fair, J. D., Berlin, O.
Falconer, T., Alexandria, Minn.
Farrington, A. M., 1436 Chapin St., Washington, D. C.
Faust, Otto, 209 Union St., Poughkeepsie, N. Y.
Fink, J. W., 58 New Lawn Ave., Arlington, N. J.
Fischer, Paul, Sta. A., F. R. D. No. 2, Columbus, O.
Fish, Pierre A., care N. Y. State Veterinary College, Ithaca, N. Y.
Fisher, Adam, City Food Inspector, Charlotte, N. C.
Fisher, Carl W., cor. A. St. & Fifth Ave., San Mateo, Cal.
Fisher, Duncan, Grandin, N. D.
Fleming, W. B., 12 Washington St., Montgomery, Ala.
Flocken, Chas. F., 307 Fourth St., S. E., Minneapolis, Minn.
Foster, R. J., Twelfth U. S. Cavalry, Fort Oglethrope, Dodge, Ga.
Francis, M., College Station, Tex.
Frederick, Hyram J., 363 E. Center St., Logan, Utah.
Fredericks, William J., Delawanna, N. J.
Friedheim, Louis, Rock Hill, S. C.
Frothingham, Langdon, 336 Bay State Road, Boston, Mass.
Fry, E. S., Naperville, Ill.
Fuller, George S., 170 Common St., Lawrence, Mass.
Fulstow, H., Norwalk, O.
Furnish, Guy C., 708 Kickapoo St., Hiawatha, Kan.

Gaddes, Wm. H., P. O. Box 44, Kelowna, British Columbia, Can.
Gain, J. H., Lincoln, Neb.
Gaines, Charles H., Chilhowee, Mo.
Gall, William, Matawan, N. J.
Gay, C. W., Swarthmore, Pa.
George, H. H. S., P. O. Box 521, Kamloops, British Columbia, Can.
Gibson, A., 412 N. Twentieth St., Birmingham, Ala.
Gibson, G. D., Adrian, Mich.
Gill, Harry D., 337 E. Fifty-seventh St., New York, N. Y.
Gill, Joseph C., cor. Second & Main Sts., Clarksville, Tenn.
Gilliland, S. H., Marietta, Pa.
Giltner, Ward, Auburn, Ala.

Glendenning, C. G., Clinton, Ill.
Glennon, J. T., 109 Plane St., Newark, N. J.
Glover, George H., Colorado State College, Fort Collins, Col.
Goentner, Charles T., Bryn Mawr, Pa.
Gohn, H. M., St. Johns, Mich.
Good, Joseph M., 731 McMakin Ave., Winton Place, Cincinnati, O.
Goodwin, J. Arthur, Napoleonville, La.
Gordon, Waldron M., 1513 Sixth Ave., Morningside, Sioux City, Ia.
Gorsuch, Dickinson, Glencoe, Md.
Goss, Leonard W., Agricultural College, Manhattan, Kan.
Gould, J. H., Eleventh Cavalry, Fort Des Moines, Ia.
Gould, J. N., Worthington, Minn.
Gould, John W., Fairmont, Minn.
Graham, James, 115 Queen St., Germantown, Pa.
Graham, Ralph, National Stock Yards, Ill.
Grange, E. A. A., 467 W. 164th St., New York, N. Y.
Green, L. Kenneth, 707 Hammond Bldg., Detroit, Mich.
Greeson, J. O., Kokomo, Ind.
Grenside, F. C., 17 W. Sixty-sixth St., New York, N. Y.
Grogan, J. P., 909 Ashland Ave., Baltimore, Md.
Groves, John W., 46 York St., Hamilton, Ontario, Can.
Griffith, J. W., Cedar Rapids, Ia.
Gunning, T. J., Room 10, Mayer Office Bldg., Peoria, Ill.

Hadwen, Seymour, Experimental Farm, Ottawa, Can.
Haffer, John W., 49 Pearl St., Paterson, N. J.
Halliday, R. J., Bayonne, N. J.
Hamblet, C. A. 495 Varnum Ave., Lowell, Mass.
Hamilton, Herbert B., 79 Hillman St., New Bedford, Mass.
Hammond, R. R., Cherokee, Ia.
Hansen, Oscar A., 89 N. Hamlin Ave., Chicago, Ill.
Hanshew, Elisha, 125 Carlton Ave., Brooklyn, N. Y.
Hanson, H. D., 160 Eldridge St., New York, N. Y.
Hanvey, G. A., Jr., Sixth U. S. Cavalry, Jolo, Philippine Islands.
Harger, Simon J., 2108 Locust St., Philadelphia, Pa.
Hargrave, John C., Dominion Vet. Inspector, Medicine Hat, Alberta, Can.
Haring, Clarence M., Experiment Station, Berkeley, Cal.
Harrington, Edw. T., 873 Broadway, South Boston, Mass.
Harris, Alexander W., 56 George St., Ottawa, Can.
Harris, J. G., Duluth, Minn.
* Harrison, Robert H., 652 Sherburne Ave., St. Paul, Minn.
Harrison, W. F., Bloomfield, N. J.
Hart, William J., Wetmore, Kan.
Harthill, Alexander, Jr., 707 Green St., Louisville, Ky.
Hartman, William J., Bozeman, Mont.
Haxby, J. W., Villisca, Ia.
Healey, Thomas W., 224 E. St. John St., San Jose, Cal.

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* Honor Roll.

Heck, W. A., West Liberty, Ia.
Helmer, Jacob, Scranton, Pa.
Hemphill, John F., 428 Dexter St., Clay Center, Kan.
Hendren, S. G., 181 Laurel Ave., Arlington, N. J.
Herr, Thos. J., 331 E. Eighty-third St., New York, N. Y.
Hewett, R. W., 6 E. Fifth St., Camden, N. J.
Heyde, W. F., 1215 S. Jefferson Ave., St. Louis, Mo.
Hickman, R. W., 2329 First St., N. W., Washington, D. C.
Hickman, Thomas S., 1336 E. Fifteenth St., Kansas City, Mo.
Higgins, Charles H., Experimental Farm, Ottawa, Can.
Hill, J. G., Jacksonville, Fla.
Hillock, T. B., 204 E. Long St., Columbus, O.
Hilton, William, 615 Spence St., Winnepeg, Manitoba, Can.
Hinebauch, T. D., Tower City, N. D.
Hoffman, F. F., Brookville, Pa.
Holden, Edward H., P. O. Box 612, Springfield, Mass.
Holden, W. C., Delphos, O.
Hollingsworth, W. G., Utica, N. Y.
Hoopes, Herbert, Forest Hill, Md.
Hope, James G., 826 Fourth St., Fort Madison, Ia.
Hopper, John B., Ridgewood, N. J.
* Hoskins, W. Horace, 3452 Ludlow St., Philadelphia, Pa.
Howard, C. H., Calumet, Mich.
* Howard, Lester H., 187 Huntington Ave., Boston, Mass.
Howe, W. R., Dayton, O.
Huelson, Julius, 76 Montgomery St., Jersey City, N. J.
Huff, Logan B., 212 Benard St., Spokane, Wash.
Huff, Wilson, Rome, N. Y.
Hughes, D. Arthur, 4193 S. Halsted St., Chicago, Ill.
Hughes, Joseph, 2537 State St., Chicago, Ill.
Hunt, Frank, 409 Cherry St., Jamestown, N. Y.
Hunter Sidney L., Fort Leavenworth, Kan.

Ilstrup, A. F., Willmar, Minn.

Jacob, M., 314 W. Church Ave., Knoxville, Tenn.
Jacobs, J. Otis, 120 West Ave., Reno, Nev.
Jacobus, J. H., 547 W. Thirty-fifth St., New York, N. Y.
Jameson, John W., 817 Pleasant St., Paris, Ky.
Jakeman, William, Halifax, Nova Scotia, Can.
James, V. L., Cooperstown, N. Y.
Jarman, G. A., Chestertown, Md.
Jelen, Frank, 1911 S. Fifteenth St., Omaha, Neb.
Jenkins, Elbert A., 2027 Morgan St., Shelbyville, Ill.
Jennings, C. G., Morris, Minn.
Jennings, J. Ellis, Shelton, Neb.
Jensen, H., Weeping Water, Neb.
Jewell, C. H., Artillery Corps, Fort Riley, Kan.

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* Honor Roll.

Johnson, G. A., Sioux City, Ia.
Joly, A., Waterville, Me.
Jones, George B., Sidell, Ill.
Jopling, William, Owosso, Mich.
Joss, Jesse W., 1511 N. Market St., Wichita, Kan.
Joy, James J., 46 Wilkins St., Detroit, Mich.
Juckniess, Paul, 2356 S. Twenty-eighth St., Omaha, Neb.

Kalb, Edward L., 126 Zumbro St., Rochester, Minn.
Kammerer, R. A., 4545 Cadet Ave., St. Louis, Mo.
Kaupp, B. F., 3712 Michigan Ave., Kansas City, Mo.
Keeley, Peter T., 238 N. Elm St., Waterbury, Conn.
Kelly, J. H., 11 Orange St., New Haven, Conn.
Kelly, Wm. Henry, 233 Western Ave., Albany, N. Y.
Kennedy, Edward D., Suite 15, Maynard Bldg., Seattle, Wash.
Kenning, R. W., Pembroke, Ontario, Can.
Kesler, George C., Holley, N. Y.
Ketchum, F. D., South St. Paul, Minn.
Keys, A. A., 82 Eighth St., Minneapolis, Minn.
Kille, W. B., Salem, N. J.
Kinsley, Albert T., 1336 E. Fifteenth St., Kansas City, Mo.
Kirby, Bassett, Woodbury, N. J.
Kirby, B. W., 100 E. Fifth St., St. Paul, Minn.
Klein, Louis A., Deputy State Veterinarian, Harrisburg, Pa.
Kline, A. J., Wauseon, O.
Klotz, Joseph W., Noblesville, Ind.
Knapp, Albert C., 2414 North Ave., Bridgeport, Conn.
Knapp, George A., Millbrook, N. Y.
Knapp, Valentine M., 68 Elm St., Danbury, Conn.
Knight, W. A., Houston, Texas.
Knowles, Albert D., 332 S. Main St., Livingston, Mont.
Knowles, M. E., Helena, Mont.
Kooker, W. S., 1116 Wallace St., Philadelphia, Pa.
Kreider, W. E., Wadsworth, O.

Labash, Charles, 102 Second St., Passaic, N. J.
La Baw, Wesley L., 108 Massachusetts Ave., Boston, Mass.
Lacroix, J. Victor, Hiawatha, Kan.
Lacy, Walter J., Room 328, Live Stock Station, Kansas City, Kan.
Laddey, John V., 52 New Lawn Ave., Arlington, N. J.
Lamb, Charles G., Capitol Building, Denver, Col.
Lamb, Morgan B., Stock Yards Station, Fort Worth, Tex.
Lambrechts, T., P. O. Box 71, Montevideo, Minn.
Lames, G., Dysart, Ia.
Land, L. M., Lexington, Ky.
La Pointe, R., Le Sueur, Minn.
Law, James, New York State Veterinary College, Ithaca, N. Y.
Lawton, Fletcher E., 110 Madison St., Greencastle, Ind.
Lee, Daniel D., 549 Albany St., Boston, Mass.

Leech, G. Edward, 322 Main St., Winona, Minn.
Leffingwell, Milton F., 108 Franklin St., Austin, Minn.
Leininger, Daniel B., 1001 E. Fifteenth St., Kansas City, Mo.
Lentz, William J., Hatboro, Pa.
Lewis, Henry S., 104 Washington St., Chelsea, Mass.
Lichty, William W., Woodstock, Ill.
Lincoln, Willis B., 925 Fatherland St., Nashville, Tenn.
Lindburg, O. Enoch, 902 Pennsylvania Ave., Washington, D. C.
Lipp, Charles C., St. Anthony Park, Minn.
Loblein, E. L., New Brunswick, N. J.
Locke, George H., Lockford, San Jaquin Co., Cal.
Lockett, Stephen, cor. Thirty-ninth and Woodland Ave., Philadelphia, Pa.
Loveberry, Clarence, 1000 Haight St., San Francisco, Cal.
Loveland, Grove W., Torrington, Conn.
Lowe, J. Payne, 171 Jefferson St., Passaic, N. J.
Lowe, Wm. Herbert, 277 Ellison St., Paterson, N. J.
Lukes, Harry, 20 Jefferson Ave., Springfield, Mass.
Luther, William H., Boonville, Ind.
Lyford, C. C., 821 Third Ave., S., Minneapolis, Minn.
Lyman, Richard P., 1260 Main St., Hartford, Conn.
Lyon, H. C., Hutchinson, Minn.

McAlpine, Donald, Brockville, Ontario, Can.
McCaffray, James, Red Bank, N. J.
McClanahan, W. A., Redding, Ia.
McConnell, Hugh M., 2204 E. Thirty-first St., Kansas City, Mo.
McCoppin, Charles R., 404 W. Second St., Hastings, Neb.
McCoun, William T., Jr., Oyster Bay, N. Y.
McCrank, J. A., Plattsburg, N. Y.
McCuaig, D., Moncton, New Brunswick, Can.
McCulley, Robert W., 160 E. Twenty-fourth St., New York, N. Y.
McCurdy, Frank C., 2606 Seneca St., South St. Joseph, Mo.
McDonald, D. M., 516 Eighth Ave., S. E., Minneapolis, Minn.
McFarland, C. M., South St. Joseph, Mo.
McGilivray, George, Spring Valley, Minn.
McGilvray, Chas. D., care Dept. of Agricul., Winnepeg, Manitoba, Can.
McGuire, William C., Cornwall, Ontario, Can.
* McInnes, Benjamin, Charlestown, S. C.
McKenzie, K. J., Northfield, Minn.
McKillip, M. H., 1639 Wabash Ave., Chicago, Ill.
McKim, Charles A., 137 N. Twenty-fifth St., Lincoln, Neb.
McKinney, William H., 3418 Vine St., Kansas City, Mo.
McLean, C. C., 1001 Water St., Meadville, Pa.
McLean, William 209 Market St., Portland, Ore.
* McLellan, F. W., 144 Noble St., Bridgeport, Conn.
McLeod, J. H., Charles City, Ia.
McMurdo, C. D., Tenth Cavalry, Fort Robinson, Neb.

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* Honor Roll.

McNalley, Michael, 1412 Pine St., St. Louis, Mo.
McNaughton, D. D., Webster, N. D.
McNeil, James C., 3349 Webster Ave., Pittsburg, Pa.
McNeil, John H., Ames, Ia.
McPherson, W. C., 451 Washington St., New York, N. Y.
Mack, Charles A., Stillwater, Minn.
Mack, James F., River Falls, Wis.
Mack, Winfred B., Univ. of Nevada, Reno, Nev.
MacKellar, William M., care Cudahy Packing Co., Los Angeles, Cal.
Mackie, Frank H., 916 Cathedral St., Baltimore, Md.
Mahaffey, Thomas J., P. O. Box 920, Jacksonville, Fla.
Mahon, James, 3622 N. Camac St., Philadelphia, Pa.
Makins, E., Jr., P. O. Box 445, Abilene, Kan.
Malcolm, Peter, New Hampton, Ia.
Mangan, Daniel J., 280 E. 162d St., New York, N. Y.
Marshall, Clarence J., 2004 Pine St., Philadelphia, Pa.
Marshall, Herbert, Charlottesville, Va.
Martenet, W. H., 1005 W. North Ave., Baltimore, Md.
Martin, Robert D., 1192 Broad St., Bridgeport, Conn.
Martin, W. E., 281 James St., Winnipeg, Manitoba, Can.
Massie, James, Kingston, Ontario, Can.
Mathews, E., 210 Varick St., Jersey City, N. J.
Mayo, Nelson S., Santiago de las Vegas, Cuba.
Mead, Rolla N., Fort Atkinson, Wis.
Meadors, W. H., National Stock Yards, Ill.
Meiners, R. F., Weehawken, N. J.
Meisner, H. A., 1133 Hartford Ave., Baltimore, Md.
Melvin, A. D., Chief Bureau of Animal Industry, Washington, D. C.
Merillat, Louis A., 1827 Wabash Ave., Chicago, Ill.
Metcalfe, A. R., Vankleek Hill, Ontario, Can.
Metzger, Abram H., Millersville, Pa.
Meyer, George W., 528 Washington St., New York, N. Y.
* Meyer, J. C., 1111 Walnut St., Cincinnati, O.
Milks, Howard J., 609 Lafayette St., Baton Rouge, La.
Miller, A. W., P. O. Box 10, Lincoln, Neb.
Miller, C. A., 613 Jackson St., Louisville, Ky.
Miller, Chester, Bureau of Animal Industry, Des Moines, Ia.
Miller, Daniel H., 1112 West Locust St., Des Moines, Ia.
Miller, Joshua, 117 Lincoln Ave., Ottumwa, Ia.
Mills, Clarence C., 355 E. Main St., Decatur, Ill.
Miner, George H., 1358 Girard St., N. W., Washington, D. C.
Minge, B. O., 1639 Wabash Ave., Chicago, Ill.
Mitchell, Aquila, Skaneateles, N. Y.
Mitchell, J. R., Evansville, Ind.
Mohler, John R., Department of Agriculture, Washington, D. C.
Molloy, John P., Morris, Manitoba, Can.
Monsarrat, William T., Box 652, Honolulu, Hawaii.

---

* Honor Roll.

Moore, A. E., 175 Waverly St., Ottawa, Can.
Moore, C. S., Box 34, Danvers, Mass.
Moore, E. L., Brookings, S. D.
Moore, Robert C., 1330 E. Fifteenth St., Kansas City, Mo.
Moore, V. A., New York State Veterinary College, Ithaca, N. Y.
Morgan, Frank C., cor. Sixth and Cherry Sts., Chattanooga, Tenn.
Morris, Edward H., 221 Main St., Derby, Conn.
Morrison, Robert J., 71 E. Alexandrine Ave., Detroit, Mich.
Moss, Harry T., Germantown, O.
Muir, Robertson, 146 Kent St., Grand Rapids, Mich.
Munce, Thomas E., Washington, Pa.
Munn, A. J., Fayette, Mo.
Murphy, Bernard W., 610 Eleventh St., St. Joseph, Mo.
Myers, M. J. Cleveland, Tenn.
Myers, Sidney D., Wilmington, O.
Myers, William F., Fort Wayne, Ind.

Nattress, Joseph T., Delavan, Ill.
Nelson, S. B., Pullman, Wash.
Nesbitt, Edward J., 19 Grand St., Poughkeepsie, N. Y.
Neson, G. E., Department of Agriculture, Manila, P. I.
Newcomb, Harrie H., 17 Beardsley St., Bridgeport, Conn.
Newcomer, E. W., Mount Joy, Pa.
Newton, John V., 619 Walnut St., Toledo, O.
Ney, William O., care Y. M. C. A., Ft. Worth, Tex.
Nicholas, George B., 1205 Charlotte St., Kansas City, Mo.
Nielson, N. Elwood, 1310 Eye St., Sacramento, Cal.
Nighbert, J. D., Pittsfield, Ill.
Nighbert, E. M., care J. D. Smith, Columbus, Ga.
Nissley, Solomon M., Middletown, Pa.
Niven, Andrew B., 464 Bancroft Ave., St. Paul, Minn.
Noack, Otto G., 54 S. Sixth St., Reading, Pa.
Norris, Clarence L., P. O. Box 126, So. Omaha, Neb.
Norton, J. C., Phoenix, Ariz.
Noyes, Orrin W., cor. Tenth St. and Madison Ave., Norfolk, Neb.
Nunn, Henry, P. O. Box 428, McMinnville, Ore.

O'Connor, Joseph, Hunter, N. D.
Odell, Edgar, 690 Lexington Ave., New York, N. Y.
Odell, Edwin O., Central City, Neb.
O'Leary, John P., 25 Live Stock Exchange, Buffalo, N. Y.
O'Neal, William R., Wayne, Neb.
Ortiz, Carlos, 26 Villa St., Ponce, Porto Rico.
* Osgood, Frederick H., 50 Village St., Boston, Mass.

Paige, James B. Amherst, Mass.
Palmer, H. F., Bennet, Col.

---

* Honor Roll.

Paquin, Leon A., P. O. Box 225, Webster, Mass.
Parker, Joseph W., Room 9, Federal Building, El Paso, Texas.
Parkinson, George H., P. O. Box 799, Middletown, Conn.
Patric, Lewis A., P. O. Box 481, Snohomish, Wash.
Paul, Arthur, Visalia, Cal.
Paxon, Harry D., 316 Exchange Bldg., Union Stock Yards, Chicago, Ill.
Pearson, Leonard, cor. Thirty-sixth and Spruce Sts., Philadelphia, Pa.
Peirce, Harrie W., Medford, Mass.
Peirce, Lawrence L., Arlington, Mass.
Penniman, G. P., 12 Dean St., Worcester, Mass.
Perkins, Chester R., 5650 Emerald Ave., Chicago, Ill.
Perrigo, W. H., 440 Reed St., Milwaukee, Wis.
Perry, Charles H., 82 Park Ave., Worcester, Mass.
Perry, F. M., Fort Fairfield, Maine.
Peters, Austin, Jamaica Plain, Mass.
Peters, A. T., Lincoln, Neb.
Peterson, William E., 501 Main St., Waltham, Mass.
Pethick, W. H., Antigonish, Nova Scotia, Can.
Pfersick, Jacob S., 3 Leonard St., Greenfield, Mass.
Phillips, Charles S., Mount Vernon, Wash.
Phillips, J. M., 3732 West Pine Bl., St. Louis, Mo.
Phillips, Robert A., Oklahoma, Okla.
Philpott, Luther B., Manti, Utah.
Piatt, D. A., 755 S. Broadway, Lexington, Ky.
Pierce, Benjamin D., 27 Sanford St., Springfield, Mass.
Pistor, Adolph J., 120 N. Seventeenth St., East Orange, N. J.
Plaskett, Joseph, Nashville, Tenn.
Playdon, Calvert H., Reading, Mass.
Plummer, Alexander, Fourth Cavalry, Fort Riley, Kan.
Poole, John W., Cedar Rapids, Ia.
Pope, Lemuel, Jr., Portsmouth, N. H.
Porter, E. C., Newcastle, Pa.
Porter, Fred W., 104 West Ross Ave., Tampa, Fla.
Potter, Jasper S., 214 S. Dubuque St., Iowa City, Ia.
Poucher, M. M., Oswego, N. Y.
Powell, Edgar W., Bryn Mawr, Pa.
Power, Richard H., Fourth Field Artillery, Ft. Keithley, Mors, P. I.
Presler, H. A., Fairbury, Ill.
Price, John O. F., Room 215 Federal Bldg., Nashville, Tenn.
Price, Richard, 219 W. Sixth St., St. Paul, Minn.

Quitman, E. L., 574 W. Van Buren St., Chicago, Ill.

Ragland, Marcus J., Monroe, N. C.
Ralston, Wyatt E., P. O. Box 75, Pullman, Wash.
Ramsay, Robert A., 1735 New Hampshire Ave., Washington, D. C.
Ranck, Edward M., 107 Main St., Natchez, Miss.
Rayner, Thomas B., 106 Highland Ave., Chestnut Hill, Philadelphia, Pa.
Read, H. W., 27 Court St., Freehold, N. J.

Reagan, W. J., 606 River St., Paterson, N. J.
Reefer, Leon N., 1321 Chapline St., Wheeling, W. Va.
Reichel, John, cor. Thirty-sixth and Spruce Sts., Philadelphia, Pa.
Repp, John J., 246 S. Sixtieth St., Philadelphia, Pa.
Reynolds, M. H., St. Anthony Park, Minn.
Rhea, R. Lee, McKinney, Texas.
Rhoads, W. L., Lansdowne, Pa.
Rhodes, C. J., Beloit, Wis.
Rich, Frank A., Burlington, Vt.
Rich, Theodore S., 19 Block J. St., Pueblo, Col.
Richards, W. H., Emporia, Kan.
Richardson, A. G. G., Union Stock Yards, Cincinnati, O.
Ridge, William H., Trevose, Pa.
Riordan, J. J., Beverly Farms, Mass.
Roadhouse, Chester L., 2129 Parker St., Berkeley, Cal.
Robert, J. C., Agricultural College, Miss.
Roberts, Guy A., Raleigh, N. C.
Roberts, George H., 214 N. Meridian St., Indianapolis, Ind.
Roberts, John H., Northampton, Mass.
Robertson, James, 344 E. Forty-fourth St., Chicago, Ill.
Robertson, James E., Monona, Ia.
* Robertson, James L., 409 Ninth Ave., New York, N. Y.
Robinson, John W., Coalharbor, N. D.
Robinson, John W., 3 Lincoln St., Natick, Mass.
Robinson, Thomas E., Westerly, R. I.
Rogers, Burton R., Kansas State College, Manhattan, Kan.
Rogers, Howard P., Allston, Mass.
Rollings, John W., Lexington, Ky.
Rosenberger, Maynard, P. O. Box 367, Santa Barbara, Cal.
Ross, Edward C., 11 Orange St., New Haven, Conn.
Roub, J. F., Monroe, Wis.
Rutherford, J. G., Veterinary Director General, Ottawa, Can.
Ryan, J. F., 2525 Indiana Ave., Chicago, Ill.
Ryder, Herman R., 5914 Superior St., Chicago, Ill.
Ryder, J. E., 153 E. Twenty-fourth St., New York, N. Y.

Salmon, Daniel E., Rivera 329, Montevideo, Uruguay, South America.
Sanford, E. F., 1035 Cathedral St., Baltimore, Md.
Saunders, Charles, 215 E. Central Ave., Eldorado, Kan.
Schaefer, Valentin, Tekamah, Neb.
Schaffter, E. P., 743 Society for Savings Bldg., Cleveland, O.
Scheibler, J. W., 271 Court St., Memphis, Tenn.
Schloemer, Charles C., 103 E. Ninty-second St., New York, N. Y.
Schmitt, Charles, Dodgeville, Wis.
Schneider, F. H., York Road and Erie Ave., Philadelphia, Pa.
Schneider, Fred L., 208 Occidental Life Bldg., Albuquerque, New Mexico.
Schroeder, E. C., B. A. I. Experiment Sta., Bethesda, Md.

---

* Honor Roll.

Schumacher, Wilhelm, 1509 W. Third Ave., Durango, Col.
Scott, George A., 315 E. Sixth St., Waterloo, Ia.
Scott, John, 212 Fayette St., Peoria, Ill.
Scott, William A., 1407 First Ave., Columbus, Ga.
Sharp, Walter E., Newton, Ia.
Shaw, Clarence E., 794 President St., Brooklyn, N. Y.
Shaw, Joseph R., 510 Golden Gate Ave., San Francisco, Cal.
Shaw, Walter, 114 E. Second St., Dayton, O.
Shealy, Alonzo S., Bureau of Science, Manila, P. I.
Shepard, E. H., 1956 E. 105th St., Cleveland, O.
Sheppard, William, Neck Road, Sheepshead Bay, Brooklyn, N. Y.
* Sherman, W. A., 340 Central St., Lowell, Mass.
Sherwood, Thomas G., 107 W. Thirty-seventh St., New York, N .Y.
Shipley, Levi U., Sheldon, Ia.
Shore, Chalmer S., Lake City, Minn.
Shumway, Daniel G., 2434 Fifth Ave., Troy, N. Y.
Sihler, C. J., cor. Seventh St. and Everett Ave., Kansas City, Kan.
Silfver, Oscar, care E. Godel & Sons, Peoria, Ill.
Silverwood, Herbert, care B. A. I., Pendleton, Ore.
Simonson, Peter, cor. Third and Broad Sts., Fremont, Neb.
Simpson, C. R., 15 Arthur St., Winter Hill, Boston, Mass.
Simpson, Hal C., Denison, Ia.
Slater, J. Harvey, Richmond, Mo.
Smith, Clarence E., 59 Broad St., New Bern, N. C.
Smith, D. King, 311 Jarvis St., Toronto, Can.
Smith, Henry S., Albion, Mich.
Smith, Robert P., Edison, Neb.
Smith, R. V., 17 Court St., Frederick, Md.
Smith, S. P., Cando, N. D.
Smith, Thomas E., 309 Barrow St., Jersey City, N. J.
Sollberger, R. J., 1412 S. Eighth St., St. Louis, Mo.
Songer, Lee C., Grand Island, Neb.
Southey, Wilbur J., 205 John St., Bridgeport, Conn.
Spaulding, Norman C., Jr., 760 W. Center St., Provo City, Utah.
Spencer, John, Blacksburg, Va.
Sprague, John D., David City, Neb.
Springer, C. W., Uniontown, Pa.
Springer, U. S., 27 Hastings St., Grand Rapids, Mich.
Stafford, Rosslyn J., Pathological Div., B. A. I., Washington, D. C.
Stanclift, Ray J., Eighth Cavalry, Fort Robinson, Neb.
Stange, C. H., Ames, Ia.
States, Harry E., 223 Concord Ave., Detroit, Mich.
Stauffer, John A., Havre, Mont.
Steddom, R. P., Bureau of Animal Industry, Washington, D. C.
Steele, Harry F., Eighth Cavalry, Fort Yellowstone Park, Wyo.
Steele, Joseph G., P. O. Box 1107, Oklahoma City, Okla.
Stepheus, Russell A., Loveland, O.

---

* Honor Roll.

Stewart, C. E., Chariton, Ia.
Stewart, Earl F., cor. Sixth and Market Sts., Beatrice, Neb.
Stewart S., 1330 E. Fifteenth St., Kansas City, Mo.
Stewart, Walter J., Tullahoma, Tenn.
Stinson, William, Chelsea, Mass.
Storm, W. J., 753 Bourse Bldg., Philadelphia, Pa.
Stouder, Kirk W., P. O. Box 527, Pullman, Wash.
Strange, A., 322 W. Fifteenth St., New York, N. Y.
Stringer, N. I., Paxton, Ill.
Stubbs, William, Caledon, Ontario, Can.
Stuhr, Walter A., Ames, Ia.
Sugden, B. A., 81 Burnside Place, Montreal, Can.
Summerfield, James J., Santa Rosa, Cal.

Tade, James M., 528 U St., Vincennes, Ind.
Tamblyn, David S., Dominion Quar. Sta., Midway, British Columbia, Can.
Taylor, Frederick, Sewickley, Pa.
Taylor, Walter J., care New York State Veterinary College, Ithaca, N. Y.
Taylor, William M., York, Neb.
Tennent, J. H., London, Ontario, Can.
Thacker, Thomas, Renfrew, Ontario, Can.
Thomas, W. A., Weaubleau, Mo.
Thompson, Mulford C., Bangall, N. Y.
Thompson, William, San Juan, Porto Rico.
Tillman, Albert C., Earlville, Ill.
Tolmie, S. F., P. O. Box 226, Victoria, British Columbia, Can.
Tomlinson, W. J., Williamsport, Pa.
Torrance, F., Winnipeg, Manitoba, Can.
Towne, George V., Thompson, Conn.
Trickett, Arthur, 2417 Grand Ave., Kansas City, Mo.
Tucker, Robert A., 1401 N St., Lincoln, Neb.
Turner, J. P., 916 O St., N. W., Washington, D. C.
Tuttle, Lyford E., Bernardsville, N. J.
Tuxill, Alfred J., Auburn, N. Y.

Underhill, B. M., Media, Pa.

Vail, Wallace F., 267 Greenwich Ave., Greenwich, Conn.
Van Es, L., Agricultural College, N. D.
Veldhuis, Zachary, 707 Hammond Bldg., Detroit, Mich.
Vliet, George B., Hackettstown, N. J.
Vogt, A. G., 119 Plane St., Newark, N. J.
Von Nordheim, William E., Wahoo, Neb.
Voorhees, E. R., Somerville, N. J.

Waddle, George, Kalamazoo, Mich.
Walker, R. G., 95 Aberdeen St., Chicago, Ill.
Waller, H. N., 109 W. Forty-second St., New York, N. Y.
Walrod, George M., Storm Lake, Ia.

Ward, Archibald R., Berkeley, Cal.
Ward, S. H., Health of Animals Dept., Ottawa, Can.
Washburn, Henry J., 704 B St., S. W., Washington, D. C.
Washburn, W. B., Tiffin, O.
Waugh, James A., 1007-9 Forbes St., Pittsburg, Pa.
Weber, S. E., Lancaster, Pa.
Webster, John H., 558 Fell St., San Francisco, Cal.
Weir, Robert, 10 Royce St., Rutland, Vt.
Welch, William B., 353 West Arrow St., Marshall, Mo.
Wende, Bernhard P., 46 Holland Place, Buffalo, N. Y.
Wescott, George F., 1008 Congress St., Portland, Me.
Wheeler, A. S., Biltmore, N. C.
Whitcomb, Morton S., State Capitol, St. Paul, Minn.
White, Charles A., 78 E. Twenty-sixth St., Chicago, Ill.
White, David S., State University, Columbus, O.
White, George R., 24 Bridge Ave., Nashville, Tenn.
White, Mack M., P. O. Box 702, Shreveport, La.
White, Mark, 1142 Gaylord St., Denver, Col.
White, T. E., Sedalia, Mo.
White, William T., 143 Walnut St., Newtonville, Mass.
Whitehouse, Arthur W., 206 S. Fourth St., Laramie, Wyo.
Whitestine, Orville G., Huntington, Ind.
Whitmore, N. P., Gardner, Ill.
Whitney, Harrison, 20 George St., New Haven, Conn.
Whitney, Jonothon C., 3 West St., N., Hillsdale, Mich.
Whyte, John D., Sherbrooke, Quebec, Can.
Wicks, A. G., 128 Clinton St., Schenectady, N. Y.
Wight, W. E., 237 McKee Place, Pittsburg, Pa.
Williams, W. L., care Veterinary Dept. Cornell Univ., Ithaca, N. Y.
Willyoung, Lester E., Artillery Corps, Fort Sill, Okla.
* Winchester, John F., Lawrence, Mass.
Winslow, Charles, Rockland, Mass.
Witte, Charles R., New Britain, Conn.
Wolf, Ortho O., W. Seventh St., Ottawa, Kan.
Wood, A. L., Hampton, Ia.
Wooden, Morris, 1435 Newton St., N. W., Washington, D. C.
Woodliffe, Mark J., 1324 Acoma St., Denver, Col.
Woodward, Benjamin T., Pathol. Division, B. A. I., Washington, D. C.
Wray, A. M., Richmond, Ill.
* Wray, W. H., 34 Streatham Hill, London, S. W., England.
Wright, Frank H., 167 Clymer St., Brooklyn, N. Y.
Wright, W. Dean, Albany, Ore.

Young, George D., 316 Live Stock Exchange, Chicago, Ill.
Young, George R., 519 Twenty-sixth Ave., Omaha, Neb.
Young, William A., 42 Plant St., Utica, N. Y.
Youngberg, A., Detroit, Minn.
Yunker, Elkan H., 2204 N. Eighteenth St., Philadelphia, Pa.

Total, 734.

---

* Honor Roll.

MEMBERS-ELECT BUT YET TO QUALIFY.

Bell, William S., Cranbrook, British Columbia, Can.
Meagher, John A., Glendale, Hamilton County, O.
Moberly, David G., Bureau of Agriculture, Manila, P. I.
Stepheus, S. H., Loveland, O. Total, 4.

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